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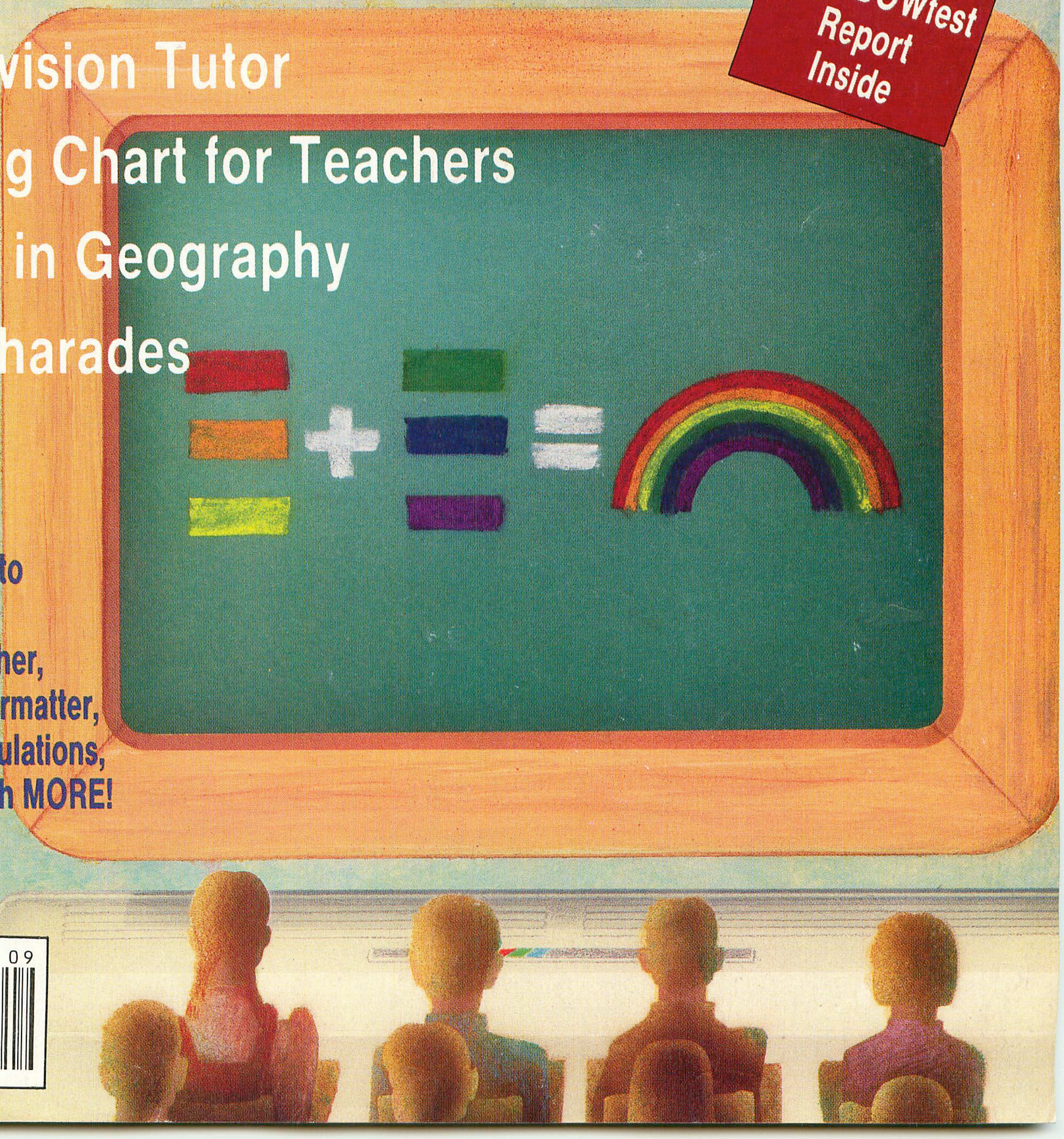

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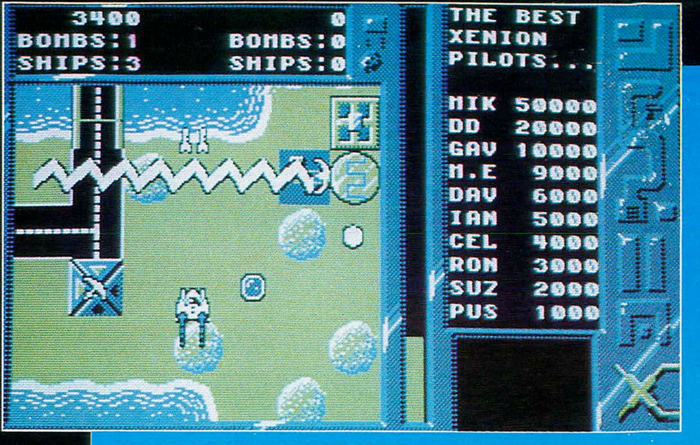
3400
BOMBS:1
SHIPS:3
0
BOMBS:0
SHIPS:0
THE BEST
XENION
PILOTS...
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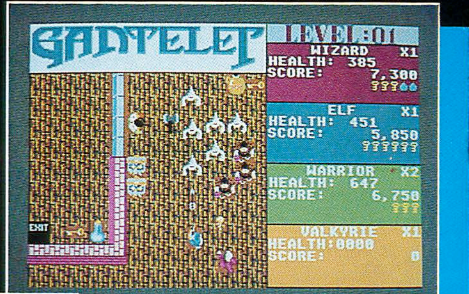
GANTELET
LEVEL:01
WIZARD X1
HEALTH: 385
SCORE: 7,300
ELF X1
HEALTH: 451
SCORE: 5,850
WARRIOR X2
HEALTH: 647
SCORE: 6,750
VALKYRIE X1
HEALTH:0000
SCORE: 0
EXIT

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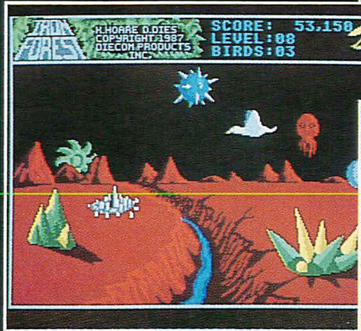
IRON FOREST
H.HOARE D.DIES
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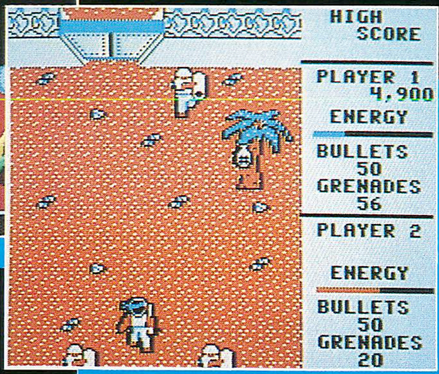
SCORE: 53,150
LEVEL:08
BIRDS:03

IRON FOREST – CoCo 3


HIGH SCORE
PLAYER 1
4,900
ENERGY
BULLETS
50
GRENADES
56
PLAYER 2
ENERGY
BULLETS
50
GRENADES
20

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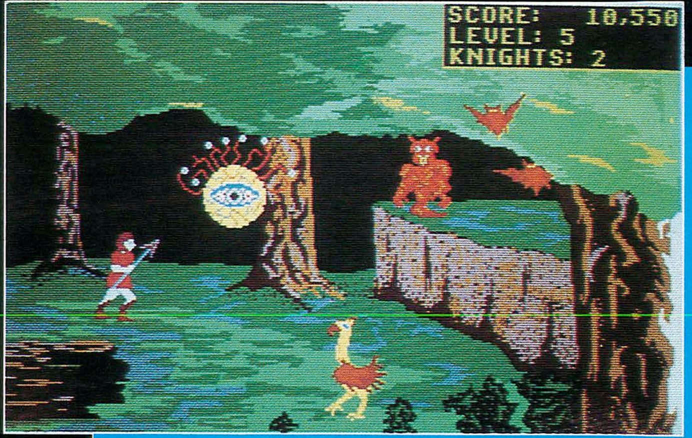
SCORE: 10,550
LEVEL: 5
KNIGHTS: 2

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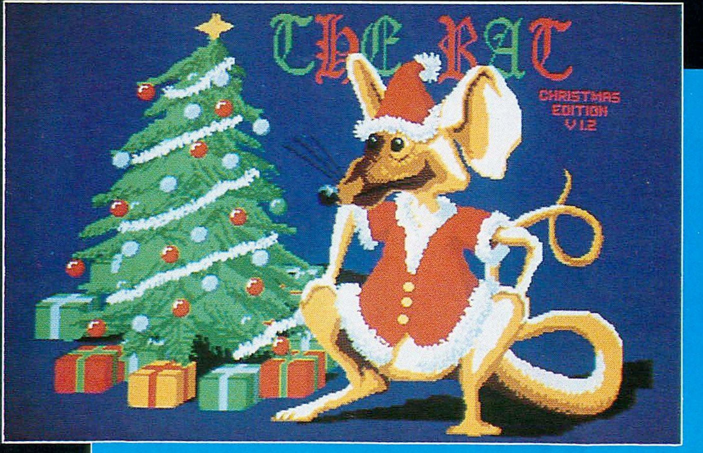
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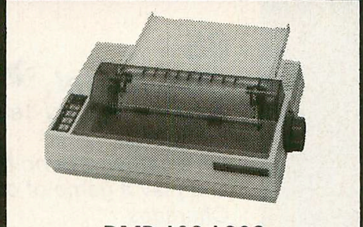

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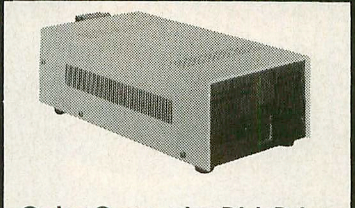

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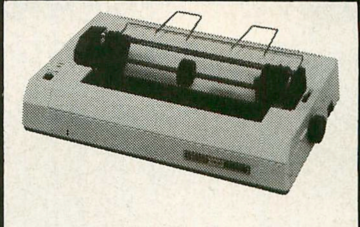

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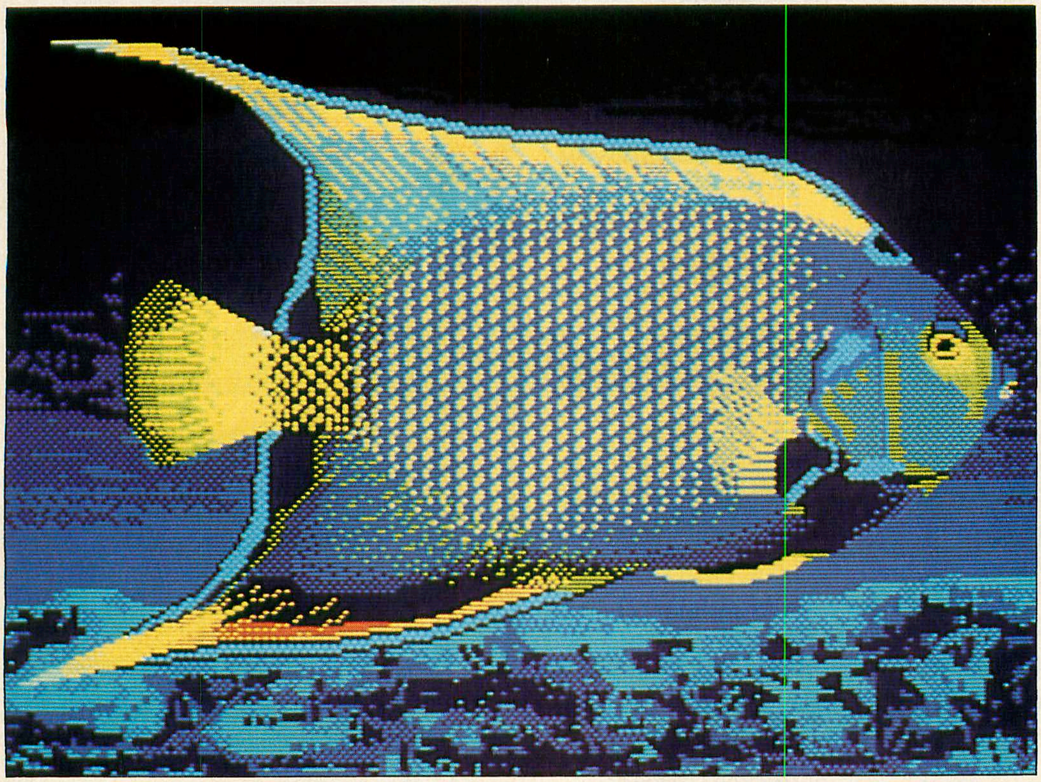

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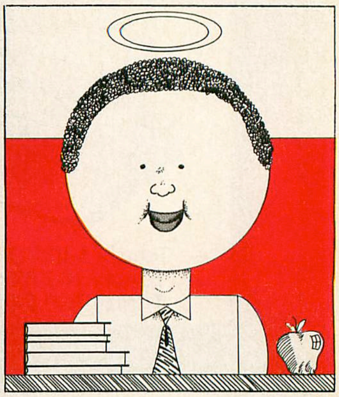

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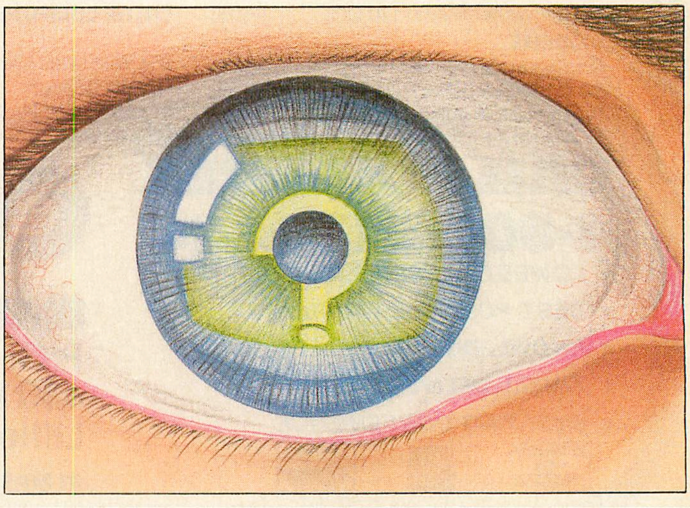

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Letters to the RAINBOW

BACK TALK

Editor:

Lonnie Falk's editorial ["Much Ado About 'The Suit'"] in the June '88 issue brings to light several basic problems within the industry itself, one of which is the nit-pick, do-or-die competition among rivals. Trying to be the fastest with the most and the biggest, with more options, features, bells and whistles, has created confused, troubled and annoyed consumers — not only in the public but the industrial consumer as well. The razzle-dazzle is the bait for the consumer to turn loose the buck.

The industry itself has forgotten the roots of its existence: service. If the glitz is there, and there is no understanding of the equipment or programs on the consumer's part, then the service aspect is lost, probably forever. Confused complexity becomes the fountainhead on which most of the newest machines are now being criticized and rejected on a regular basis.

The basic tenet in your editorial failed to mention why Tandy, and in particular the CoCo, has become the foundation and the cornerstone of a successful, popular home system. The CoCo exists today because of people. Thousands of people all across the United States, some in user groups, some acting alone, have supported, helped and taught others to use and understand the CoCo. No other machine enjoys such outstanding support. People's support means maximum service, whether you're a beginner or an engineer, and has made the CoCo what it is today. It is precisely because of this support that the CoCo is so delightfully adaptable; your imagination is the only limit.

Our little support group has demonstrated, experimented, taught, and argued over almost everything about the CoCo. Quite a few people obtained a great deal of help, support and encouragement without a huge investment of time and cost in a trial and error effort.

Opening up various programs and systems will allow a further simplicity and understanding of the basic machine, thus aiding everyone in its use. This is something Apple has failed to do and IBM is just now correcting. A machine will always remain just that until people themselves are supported either at the corporate or grass-roots level, "the suit" not withstanding.

Fred K. Garcia
Santa Maria, CA

Vaccinating Your System

Editor:

I want to comment on Jim Stafford's letter [July 1988, Page 6]. First, Trojan horses and viruses are not the same breed of pest. A Trojan horse program can only erase the disk on which it resides. A virus can replicate itself in a computer's memory and copy itself onto any disk placed in the drive. Therefore, a Trojan horse is the lesser of the two evils.

Those who never boot up OS-9 have little to fear. To be effective, a virus must place itself in the system bootfile so that it is loaded at every computer use. Since Disk BASIC boots from ROM, a virus terminates when the machine shuts down. If you use ADOS-3 or a DOS you must first load, there is a small threat. Vaccinate the system by burning the original system (from the original disk) into an EPROM.

OS-9 is a different story. Whoever created the original virus could easily build another that hides in the OS-9 `p1` module and infects every OS-9 disk you have. There *are* precautions you can take against these nuisances.

OS-9 users should keep a backup of the system disk used to boot up. Use a *current* backup of the BASIC09 and system disks originally with the OS-9 system. Create and back up the customized disk and then store it. After downloading programs from a public domain BBS, use the `Compare` command to compare the OS-9Boot file on your backup. Then run all of the downloaded programs individually, comparing your backup after each. If any changes occur, don't reboot with that disk or use it until someone competent has checked it out. *Never* use an unchecked program on your hard disk. Don't even access the hard disk until you are certain the new program is virus-free.

Mike Stute
Hays, KS

An Anniversary Surprise

Editor:

I studied the cover of the July 1988 issue for a long time. I noticed that there were seven characters: one for each anniversary! At first I thought each character carried a sample copy of THE RAINBOW, but then I found that they were each carrying a different anniversary issue. Dorothy carries the premier issue. The other characters carry the following issues: Toto, '83; Lion, '84; Wizard, '85; Tin Woodman, '86; Scarecrow, '87; and CoCo, '88. Toto shouldn't carry the July '83 issue in his mouth. That issue included a soundsheet (record) of the programs. Toto would have bent (and dampened) the soundsheet.

With the exception of the May '82 issue, my RAINBOW collection is complete. Does any reader have that issue for sale?

I like the new clear plastic mailer. Now the postal service can *see* why we enjoy THE RAINBOW so much.

Lee Deuell
Shell Rock, IA

REQUEST HOTLINE

Editor:

We are a CoCo family. We have three: a CoCo 1 with 64K and two single-sided disk drives; a CoCo 3 with 512K and two double-sided drives; and a CoCo 3 with 128K and two double-sided disk drives, a monocrome monitor and NX1000.

Every month I read letters and articles in THE RAINBOW questioning or defending the CoCo. The basic question seems to be: *Is it* a computer or a toy?

The CoCo is a very talented computer; however, it lacks what is needed to keep it from being considered a toy. That is *software.*

I am a knowledgeable computer user; I am not, and do not want to be, a programmer. That's my son's love, not mine.

Two of my CoCos are used for two different small businesses at two locations. To say that I have outgrown the business application software I have seen is an understatement.

I do word processing and use *TW-64* as modified by *TW-80*, with no complaints. I also do a lot of mail lists, some large, and most ranging between 200-500 names, and I know of no commercially available CoCo software that can handle these lists. We have modified a commercial software package that "only runs on the CoCo 1 and 2" to run on our CoCo 3s. We run both disk-resident versions and RAM disk versions. At this stage, it is more than adequate.

I run *DynaCalc*, which is a fine spreadsheet. But when will we see a CoCo 3 version that uses the capabilities of our machine?

I use a much-modified inventory control program that does the job for me, and a commercially available accounts receivable package whose general ledger portion is not adequate. Instead, I use a *DynaCalc* spreadsheet for this purpose.

I do not feel the CoCo 3 has the business software available to make this most capable tool a true computer. I am ready for fully integrated business packages, but where are they? Am I alone? We have the hardware and the operating systems, but not the software.

In addition, I would like to see THE RAINBOW do more for business applications. I know we have a yearly Business issue, but I would like to see a monthly business column — a forum where those of us who want to use the CoCo could exchange ideas, patches, reviews, comments on business software, modifications and programs.

Paul M. Cornez
Springfield, OH

See SD Enterprises' ad for information on VIP Database III *and Sugar Software's ad for information on* TIMS Mail.

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PXE Computing
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214/699-7273

INFORMATION PLEASE

Editor:

I have a TRS-80 II with disk. I would like to purchase a small printer that uses 3- or 3½-inch roll paper.

Can you give me information on such a printer and where to purchase it? I have seen a Citizen's DP 560-CD being used on a Commodore, but the stores in Corpus Christi, Texas, don't know where I can buy this printer.

I would buy a larger printer if there is one available that you can use 3½-inch tape or perforated paper on.

Marie Tucker
Rt. 4, Box 178-C
Robstown, TX 78380

Printing Transparencies

Editor:

I have been a loyal reader and supporter of your advertisers since I purchased my CoCo 2 in October 1985. I have gradually added the CGP-220, *CoCo Max II* and hardcopy, as well as other font, border, and picture collections.

As a college business instructor and management trainer, I use my CGP-220 to print graphics for use on plastic overhead projector transparencies. At present, I print out the graphics and then use a copier to transfer them onto the plastic transparency sheets. I recently learned that an ink jet printer may be used to print color graphics directly on transparency sheets. I have tried to do this, but on standard transparency plastic, the ink from my CGP-220 will not dry. A source at Tandy in Fort Worth told me that a transparency sheet was once available for the CGP-220, but it has been discontinued for over a year.

In the February '88 RAINBOW, Charles R. Womble said that the CGP-220 is still made by Canon USA, Inc., as the PJ-1080A Ink Jet Printer. Canon makes the FPAL-10 transparency sheet for this ink jet printer. Have any RAINBOW readers successfully used these sheets, or any other brand of transparency plastic, in the CGP-220 to make color overhead transparencies?

Melanie Roy
304 Stacie Ct.
Savannah, GA 31406

Help with *DynaCalc*

Editor:

In the January '88 issue of RAINBOW, you have what appears to be a fine program, *Appointment Calendar*, by W.J. Holdorf (Page 100).

I have a 512K CoCo 3 with two drives and an Epson RX-80 printer. I am hoping that one of your readers can supply me with the needed corrections to use this program with my printer. (A programmer, I am not.)

My second request is in regard to *DynaCalc*. When I enter `/P`, the screen shows I am formatted for single spacing; however, I am not getting single spacing on my printouts. Some of my files are 50 to 60 lines long, and I want to put them on one sheet of paper.

My third problem is also about *DynaCalc*. I can find no way to save my files on a separate disk. The only thing I have been able to do is save them on the same disk as the program. I want to be able to have a data disk.

Charles W. Currier
96 Shamrock Circle
Santa Rosa, CA 95403

To modify Appointment Calendar *to run on your Epson RX-80, follow the instructions detailed in "Printer Diversions and Conversions" on Page 142 of the August '88 issue.*

We assume you are using the OS-9 version of DynaCalc *as sold by Radio Shack. To eliminate the extra linefeed, you will need to use* Debug *or* Modpatch *to make the following changes to* DynaCalc:

Offset	Old Value	New Value
7	80	81
8	63	62
4BE2	26	20
5215	16	17

KUDOS

Editor:

Thanks to Microcom Software. A couple of weeks ago I ran into a problem with *Word Power 3.1*. Whenever I changed the parameter on the Option menu, the program locked up. I wrote Microcom, explained my problem and asked if there was a software patch to fix the problem. One week later, I received a new copy of the program, a sincere apology and explanation. (Apparently the copy program contained an error that caused the Option menu to hang up.) Naturally, the new copy works perfectly.

It's good to know there are some honest companies that offer prompt, sincere service. I hope other readers keep this in mind when looking for new CoCo products.

Dave France
Davenport, IA

Far-Reaching Thanks

Editor:

I live on a little island in the Pacific Ocean (really, I do!). The nearest Radio Shack Store is over 5,000 miles away. I was reluctant to sustain my computing needs through mail order.

THE RAINBOW is my only link with the real world. On the inside front cover of the magazine, I found a company that has met my needs with excellent service. My new CoCo 3 arrived in November, the disk drive in February and the software in June. Each order took less than two weeks to travel halfway across the world! My thanks go to Computer Plus for supporting RAINBOW and its readers around the world.

Steve Knapik
Technical Sgt, USAF

PEN PALS

- I am a 20-year-old robotics assembly line electrician looking for pen pals from the U.S. and around the world. I have a 64K CoCo 2, a 128K CoCo 3, FD 501 drive, DMP-105 printer, Multi-Pak and a Radio Shack modem.

Tim Fultz
Rt. 1, Box 275
Bonneau, SC 29431

- I am 18 years old and would like to have pen pals from anywhere. I have a CoCo 1, a CoCo 3, two drives, a modem and SG-10X printer.

Pedro A. Torres
Cuernavaca 1699
Venus Gardens
Rio Piedra, PR 00926

- I am a 48-year-old man who would like to correspond with any individual who enjoys the CoCo 3 and enjoys typing in programs from THE RAINBOW. I own a 128K CoCo 3, FD 501 disk drive, CCR-82 cassette recorder and DMP-105 printer.

Donald L. Villiard
122 Cedar Lane
Starkville, MS 39759

- I am 15 years old and have a 64K CoCo 2, 128K CoCo 3, TEAC 55bv DS/DD drive, STAR NX-10 printer, DMP-106 printer, a CCR-81 cassette recorder, and a CM-8 RGB monitor. I am looking for pen pals in the central Illinois area but would like pen pals anywhere in the United States also.

Vance Evan Pierce
1306 N. Franklin
Danville, IL 61832

- I am 19 years old and looking for a pen pal from anywhere in the world. I have a CoCo 2, DMP-105 printer and a FD 501 disk drive. If you enjoy using your computer and being able to learn new things every time you use it, like I do, write!

Karen Rimiller
RR #1, Box 8600
Adams, NY 13605

- I would like to have pen pals from everywhere. I am new to computers. I have a CoCo 1, CoCo 3, SG-10 printer, modem, two disk drives and a Multi-Pak. I promise to answer every letter.

Sharon Decoopman
64 Devonshire Ave.
Apt. 302
Tillsonburg, Ontario
Canada N4G 4K9

- I am 28 years old and have had my CoCo 2 for three years. I have two disk drives, cassette, modem and a DMP-106 printer. I will respond to all who write.

Norman Lamoureux
254½ Confederation Street
Sarnia, Ontario
Canada N7T 2A1

- I am 16 years old and am looking for pen pals anywhere in the world. I enjoy Adventures and programming. I have a CoCo 2 and a disk drive and plan to buy a printer in the near future. I will answer all letters.

Joseph Delaney
3527 Kindling Drive
Augusta, GA 30906

BULLETIN BOARD SYSTEMS

- The Glass Menagerie BBS is now running at 300/1200/2400 baud. We have 43 Meg of hard disk storage online. We offer over 420 public domain CoCo programs for the CoCo 2 and 3. We have a great game room and a large message base that includes SIGs for all major computer types. We also have workshops for BASIC, OS-9 and, soon, machine language programming. The BBS runs on a CoCo 2, using a highly modified *Colorama* BBS program. All support files and programs, and most games were written by the SysOp and Co-SysOp. The phone number is (215) 376-1819.

Allen Cravener (SysOp)
Lewis Brubaker (Co-SysOp)
The Glass Menagerie
1137 Cotton St
Reading PA 19602

- I am pleased to announce the grand opening of ComStar 3, Atlanta's first and only CoCo 3 BBS. We run the Tandy User's BBS v. 2.4 on a 512K CoCo 3. Features include CoCo 3 uploads and downloads, EMAIL and message bases for every interest. Online 24 hours a day, seven days a week, at 300/1200 baud, 8-N-1. New callers are granted immediate accounts. Call (404) 980-0088 and log on today.

Jeff Freeman (SysOp)
ComStar 3
1960 Spectrum Circle
Atlanta, GA 30067

- I invite all CoCo enthusiasts to call Trader's Hotline BBS. It features 40 Meg of storage, 17 subject boards ranging from movie reviews to political discussion, over 400 online text files, and a CoCo AE with XModem, YModem and upload and download. We run 24 hours a day at 300/1200/2400/4800/9600 baud, 7-E-1. Call (405) 436-6885.

Colin J. Smith
R 3, Box 212c
Ada, OK 74820

- The CoCoshop BBS of West Valley turns one year old in July '88. We are running our BBS on *Color Connect* BBS Software v. 1.1 written by our SysOp, Terry Gray. We run at 7-E-1, 300/1200 baud. Call (801) 250-1941.

The DataWarehouse of Spokane, Wash. and its sister-board in Salt Lake City, Utah, are both using software written by Spokane's Dennis Mott. Both boards run at 7-E-1, 300/1200 baud. The Spokane DataWarehouse can be reached at (509) 325-6787. Call (801) 969-6051 to reach The DataWarehouse in Salt Lake City.

Dennis Gray (SysOp)
CoCoshop
3643 S. 6885 W.
West Valley City, UT 84120

- There is a new BBS in Philadelphia, Pa. It runs under *CoBBS* and is online 24 hours a day, seven days a week. The board is free to use and has XModem, upload and download. The board is 8 bit with one stop and no parity. *No* copywritten programs are allowed. Call (215) 426-8991.

John L. Leach (SysOp)
1353 Earl St.
Philadelphia. PA 19125

THE RAINBOW welcomes letters to the editor. Mail should be addressed to: Letters to Rainbow, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. Letters should include the writer's full name and address. Letters may be edited for purposes of clarity or to conserve space.

Letters to the editor may also be sent to us through our Delphi CoCo SIG. From the CoCo SIG> prompt, type `RAI` to take you into the Rainbow Magazine Services area of the SIG. At the RAINBOW> prompt, type `LET` to reach the LETTERS> prompt and then select Letters for Publication. Be sure to include your complete name and address.

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Unparalleled Power packed in this 100% ML Word Processor written from scratch for the CoCo 3! **No other word processor offers such a wide array of features that are easy to learn & use.**

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Word Power 3.2 runs at double-clock speed and uses the **true 80-column display** with lowercase instead of the graphics screen. The result is lightning fast screen reformatting and added speed! **All prompts are displayed in plain English in neat colored windows.** The current column number, line number, page number, percentage of free memory is displayed at all times. Even the **page break** is displayed so you know where one page ends and the other begins. The Setup program allows you to change fore/background colors as well as (in)visible carriage returns. Word Power 3.2 can be used with RGB/Composite/Monochrome monitors as well as TV.

MAXIMUM MEMORY

Word Power 3.2 gives you **over 72K** on 128K and **over 450K** on 512K CoCo 3 for Text Storage - more memory than any other CoCo word-processor. Period.

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Word Power 3.2 has one of the **most powerful and user-friendly full-screen editor with word-wrap.** All you do is type. Word Power takes care of the text arrangement. The unique **Auto-Save** feature saves text to disk at regular intervals for peace of mind.

Insert/Overstrike Mode (Cursor Style Changes to indicate mode);OOPS Recall during delete;Type-ahead Buffer for fast typers;Key-Repeat (adjustable); Key-Click; 4-way cursor and scrolling; Cursor to beginning/end of text, beginning/end of line, top/bottom of screen, next/previous word; Page up/down; Delete character, previous/next word, to beginning/end of line, complete line, text before/after cursor; Locate/Replace with Wild-Card Search with auto/manual replace; Block Mark, Unmark, Copy, Move & Delete; Line Positioning (Center/Right Justified); Set/Reset 120 programmable tab stops; Word-Count; Define Top/Bottom/Left/Right margins & page length. You can also highlight text (underline-with on-screen underlining, bold, italics, superscripts, etc.). Word Power even has a **HELP** screen which an be accessed any time during edit.

SPLIT-SCREEN EDITING

Splits the screen in half so you can view one portion of your text while you edit another. You'll love it!

MAIL-MERGE

Ever try mailing out the same letter to 50 different people? Could be quite a chore. Not with Word Power 3.2! Using this feature, you can type a letter, follow it with a list of addresses and have Word Power print out personalized letters. It's that easy!

CALCULATOR

Pop-up a 4-function calculator while you edit! Great for tables!

SAVING/LOADING TEXT

Word Power 3.2 creates ASCII format files which are compatible with almost all terminal/spell-checking & other word-processing programs. Allows you to Display Free Space, Load, Save, Append & Kill files. The ARE YOU SURE? prompt prevents accidental overwriting & deletion. You can select files by simply cursoring through the disk directory. Supports double-sided drives & step-rates.

PRINTING

Word Power 3.2 drives almost any printer (DMP, EPSON, GEMINI, OKIDATA, etc). Allows options such as baud rates, line spacing, page/print pause, partial print, page numbering/placement, linefeeds, multi-line headers/footers, right justification & number of copies. The values of these parameters & margins can be changed anytime in the text by embedding Printer Option Codes. The **WHAT YOU SEE IS WHAT YOU GET** feature allows you to preview the text on the screen as it will appear in print. You can view margins, page breaks, justification & more.

PRINT SPOOLER

Why buy a hardware Print Spooler? Word Power 3.2 has a **built-in Spooler** which allows you to simultaneously edit one document & print another.

TWO-COLUMN PRINTING

This unique feature allows you to print all or portion of your text in **two columns!** Create professional documents without hours of aligning text.

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This checker will proofread your text for punctuation errors such as capitalization, double-words, spaces after periods/commas, and more. Its the perfect addition to any word processor.

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Word Power 3.2 comes with a well-written instruction manual & reference card which makes writing with Word Power a **piece of cake!** Word Power 3.2 comes on an UNPROTECTED disk and is compatible with RSDOS. Only **$79.95**

(Word Power 3.1 owners can get Word Power 3.2 Upgrade FREE by sending proof of purchase & $5.00 to cover S&H costs & instructions)

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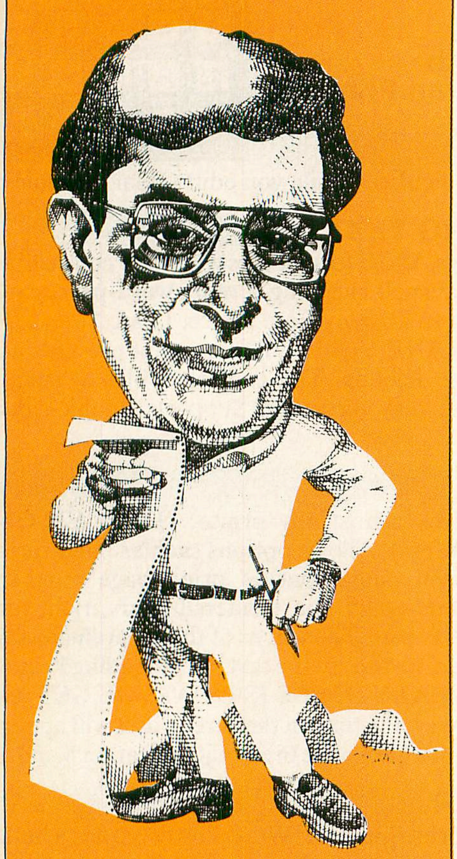


The Computer's Place in Education

This is our annual Education issue, and I am quite pleased that of all the themes we have used in THE RAINBOW over the years, this one seems to be the longest-lived.

Even before there was a Games issue, there was an Education issue. Indeed, our first Education issue wasn't much, but it did appear.

I see computers as vastly important in the education area. And while today there are a lot of fancy programs out for our CoCo and other machines, with spectacular graphics and the like, the simple fact is that you don't need all that stuff to make a computer a viable help for students.

I know.

Both of my daughters are past the time they ask "Daddy" for help in schoolwork — primarily because the elder has finished college and embarked on a career in advertising, and my "baby" is away at school and Daddy isn't there to help.

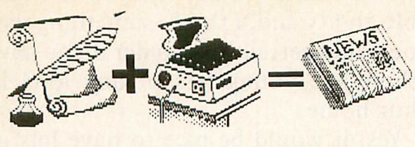
But there were many nights — admittedly, the night before the test — when a small head would peek around the door with the question, "Can you test me?" Sometimes the "testing" was fun, sometimes not. The worst was in foreign languages, where the vocabulary drill was boring to me, and the "dumb" pronunciations I gave for the "right" answer often provoked some amount of laughter on the part of the testee.

I fixed 'em. I wrote a short program in BASIC that would test for vocabulary words, selected them randomly, and even asked the questions "both ways."

(For those of you unfamiliar with the term, asking "both ways" means asking the meaning of "gracias" one time and "thank you" another. Both ways. English-to-Spanish and Spanish-to-English.)

This was a pretty simple program, done with data statements and a `FOR-NEXT` loop. But it worked. In fact, elder daughter Wendy's grade in first-year French went from a 'C' to an 'A' in one grading period with the help of "Daddy's Program." Similar programs have appeared in THE RAINBOW over the years.

COCO NEWSROOM



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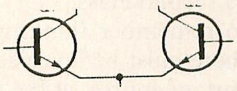

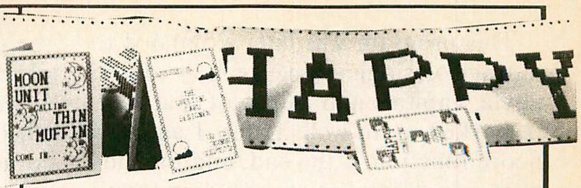
MOON UNIT CALLING THIN MUFFIN COME IN
HAPPY

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This program was later expanded to testing for single-name items — dates, phyla, capitals and things of that sort. It worked quite well. Later, I added a Score function at the end, and the kids were not allowed to stop studying until they got a 90 or better on the test.

(If you think that's mean, a 90 is a 'B' in the Louisville public school system; you have to have a 93 for an 'A.' Of course, the girls thought it was mean.)

Regardless, I read a great deal about how truly *worthwhile* educational programs do much more than just drill students. I think the writers of that sort of thing are missing something. Certainly, I believe we can enhance education by also entertaining our students — my sixth-grade teacher, Mrs. Dierking, was excellent at teaching grammar by letting us write short stories; my senior English teacher, Miss Mackey, really made Shakespeare come alive by acting out some of the scenes from *Macbeth* — but at the same time, I also think we can entertain 'em to death.

The first business of learning is to learn. And there are some things — actually, a lot of things — that can only be learned by memorizing them. Yes, it is easier to memorize the phyla if you really understand the concept of what the types of living things in each of them are and do. But if you don't know the names in the first place, you're out of luck.

Probably the most difficult course I ever had in my educational experience was one called "Geography of the Soviet Union." My professor, Dr. Walter Koch, was one of the world's experts on the subject, and he was a good teacher. I had taken "Geography of North America" from him the semester before, liked him a great deal, thought he was extremely knowledgeable (I had also made an 'A'!) and wanted to take the course he taught for which he was nationally known.

Dr. Koch was another of those gifted teachers who could make information come alive. But I had no frame of reference — I didn't even know there were "states" in the Soviet Union like there are in the United States. Besides, they all had strange-sounding names that were, at best, difficult to spell. And, while he told us something generally about each one in the first day's lecture (the concept), we still had to memorize the names. No other way to do it.

Well, though on a more elementary level, of course, it is difficult enough to teach kids that Bismarck is the capital of North Dakota, but chances are they have at least *heard* of North Dakota (North Dakota readers will pardon this analogy, please, and substitute Jackson and Mississippi if they like). Try Tallinn and Estonia, Kiev and the Ukraine. And those are the easy ones to spell.

I wrote them all down in two columns on a sheet of paper, holed up in the library for an hour or so and was ready for the second class.

I do remember thinking at the time that there must be an easier way. There was, but, of course, at the time I had no access to a computer; if I had, they never would have allowed me to waste valuable and expensive mainframe time learning the Soviet states and their capitals.

What if I had had a CoCo? Truth is, if I had simply had the program I wrote years later with empty data statements, I would have most likely had everything half-memorized by the time I typed in the data statements to give me the questions and answers. I made a 'B' in the class; with a CoCo, it most likely would have been an 'A.'

My only point is: Let's not disparage the ability of a computer to provide essential drill for students. It is a valuable ability and, I think, something that you could certainly consider if you have school-age youngsters of any level in your home.

Yes, it would be nice to have lots of graphics, songs and stuff for them when they get "the right answers." But they learn just as easily without them. And learn well.

* * *

This month's issue of THE RAINBOW, as you probably notice, is smaller than last month's. I know a lot of you worry when things change here, so I thought I would mention some of the reasons.

First, the summer is always a slower period for us. Advertisers frequently cut back some in the summer and new advertisers do not "start up" as fast. This, obviously, reduces ad pages. Magazines must maintain a relationship between advertising pages and editorial pages. We have, for just this reason, done this almost every summertime. And we've put the pages back in when fall arrives. We expect to do so this year as well.

Also, I am sure you have noticed that we have been missing a couple of mailing dates with the magazine, and your copies have come a bit later. We're trying to catch up, even though our business, like yours, finds people taking vacations in the summer.

So, what we're doing is simply taking advantage of the natural slowdown of the summer to produce a few fewer pages and get started on the next month's issue a little earlier. In this way, we expect to catch up with things shortly and get back on schedule.

It is no big deal, but I thought you would like to know.

— Lonnie Falk

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How To Read Rainbow

When we use the term CoCo, we refer to an affectionate name that was first given to the Tandy Color Computer by its many fans, users and owners.

The BASIC program listings printed in THE RAINBOW are formatted for a 32-character screen — so they show up just as they do on your CoCo screen. One easy way to check on the accuracy of your typing is to compare what character "goes under" what. If the characters match — and your line endings come out the same — you have a pretty good way of knowing that your typing is accurate.

We also have "key boxes" to show you the *minimum* system a program needs. But, *do* read the text before you start typing.

Finally, the little disk and/or cassette symbols on the table of contents and at the beginning of articles indicate that the program is available through our RAINBOW ON DISK or RAINBOW ON TAPE service.

Using Machine Language

The easiest way to "put" a machine language program into memory is to use an editor/assembler, a program you can purchase from a number of sources. All you have to do, essentially, is copy the relevant instructions from THE RAINBOW's listing into CoCo.

Another method of putting an ML listing into CoCo is called "hand assembly" — assembly by hand, which *sometimes* causes problems with `ORIGIN` or `EQUATE` statements. You ought to know something about assembly to try this.

Use the following program if you want to hand-assemble ML listings:

```
10 CLEAR200,&H3F00:I=&H3F80
20 PRINT "ADDRESS:";HEX$(I);
30 INPUT "BYTE";B$
40 POKE I, VAL("&H"+B$)
50 I=I+1:GOTO 20
```

This program assumes you have a 16K CoCo. If you have 32K, change the `&H3F00` in Line 10 to `&H7F00` and change the value of `I` to `&H7F80`.

OS-9 and RAINBOW ON DISK

The OS-9 side of RAINBOW ON DISK contains two directories: `CMDS` and `SOURCE`. It also contains a file, `read.me.first`, which explains the division of the two directories. The `CMDS` directory contains executable programs and the `SOURCE` directory contains the *ASCII source* code for these programs. BASIC09 programs will only be offered in source form so they will only be found in the `SOURCE` directory.

OS-9 is a very powerful operating system. Because of this, it is not easy to learn at first. However, while we can give specific instructions for using the OS-9 programs, you will find that the OS-9 programs will be of little use unless you are familiar with the operating system. For this reason, if you haven't "learned" OS-9 or are not comfortable with it, we suggest you read *The Complete Rainbow Guide to OS-9* by Dale Puckett and Peter Dibble.

The following is not intended as a course in OS-9. It merely states how to get the OS-9 programs from RAINBOW ON DISK to your OS-9 system disk. Use the procedures appropriate for your system. Before doing so, however, boot the OS-9 operating system according to the documentation from Radio Shack.

1) Type `load dir list copy` and press ENTER.
2) If you have only one disk drive, remove the OS-9 system disk from Drive 0 and replace it with the OS-9 side of RAINBOW ON DISK. Then type `chd/d0` and press ENTER. If you have two disk drives, leave the sytem master in Drive 0 and put the RAINBOW ON DISK in Drive 1. Then type `chd/d1` and press ENTER.
3) List the `read.me.first` file to the screen by typing `list read.me.first` and pressing ENTER.
4) Entering `dir` will give you a directory of the OS-9 side of RAINBOW ON DISK. To see what programs are in the `CMDS` directory, enter `dir cmds`. Follow a similar method to see what source files are in the `SOURCE` directory.
5) When you find a program you want to use, copy it to the `CMDS` directory on your system disk with one of the following commands:

One-drive system: `copy /d0/cmds/` *filename* `/d0/cmds/`*filename* `-s`

The system will prompt you to alternately place the source disk (RAINBOW ON DISK) or the destination disk (system disk) in Drive 0.

Two-drive system: `copy /d1/cmds/` *filename* `/d0/cmds/` *filename*

Once you have copied the program, you execute it from your system master by placing that disk in Drive 0 and entering the name of the file.

The Rainbow Seal

RAINBOW
CERTIFICATION
SEAL

The Rainbow Certification Seal is our way of helping you, the consumer. The purpose of the Seal is to certify to you that any product that carries the Seal has actually been seen by us, that it does, indeed, exist and that we have a sample copy here at THE RAINBOW.

Manufacturers of products — hardware, software and firmware — are encouraged by us to submit their products to THE RAINBOW for certification.

The Seal is not a "guarantee of satisfaction." The certification process is different from the review process. You are encouraged to read our reviews to determine whether the product is right for your needs.

There is absolutely no relationship between advertising in THE RAINBOW and the certification process. Certification is open and available to any product pertaining to CoCo. A Seal will be awarded to *any* commercial product, regardless of whether the firm advertises or not.

We will appreciate knowing of instances of violation of Seal use.

Rainbow Check Plus

The small box accompanying a program listing in THE RAINBOW is a "check sum" system, which is designed to help you type in programs accurately.

Rainbow Check PLUS counts the number and values of characters you type in. You can then compare the number you get to those printed in THE RAINBOW. On longer programs, some benchmark lines are given. When you reach the end of one of those lines with your typing, simply check to see if the numbers match.

To use *Rainbow Check PLUS*, type in the program and save it for later use, then type in the command `RUN` and press ENTER. Once the program has run, type `NEW` and press ENTER to remove it from the area where the program you're typing in will go.

Now, while keying in a listing from THE RAINBOW, whenever you press the down arrow key, your CoCo gives the check sum based on the length and content of the program in memory. This is to check against the numbers printed in THE RAINBOW. If your number is different, check the listing carefully to be sure you typed in the correct BASIC program code. For more details on this helpful utility, refer to H. Allen Curtis' article on Page 21 of the February 1984 RAINBOW.

Since *Rainbow Check PLUS* counts spaces and punctuation, be sure to type in the listing exactly the way it's given in the magazine.

```
10 CLS:X=256*PEEK(35)+178
20 CLEAR 25,X-1
30 X=256*PEEK (35)+178
40 FOR Z=X TO X+77
50 READ Y:W=W+Y:PRINT Z,Y;W
60 POKE Z,Y:NEXT
70 IFW=7985THEN80ELSEPRINT
   "DATA ERROR":STOP
80 EXEC X:END
90 DATA 182, 1, 106, 167, 140, 60, 134
100 DATA 126, 183, 1, 106, 190, 1, 107
110 DATA 175, 140, 50, 48, 140, 4, 191
120 DATA 1, 107, 57, 129, 10, 38, 38
130 DATA 52, 22, 79, 158, 25, 230, 129
140 DATA 39, 12, 171, 128, 171, 128
150 DATA 230, 132, 38, 250, 48, 1, 32
160 DATA 240, 183, 2, 222, 48, 140, 14
170 DATA 159, 166, 166, 132, 28, 254
180 DATA 189, 173, 198, 53, 22, 126, 0
190 DATA 0, 135, 255, 134, 40, 55
200 DATA 51, 52, 41, 0
```

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Stalking the Used Car

By Richard Johnson

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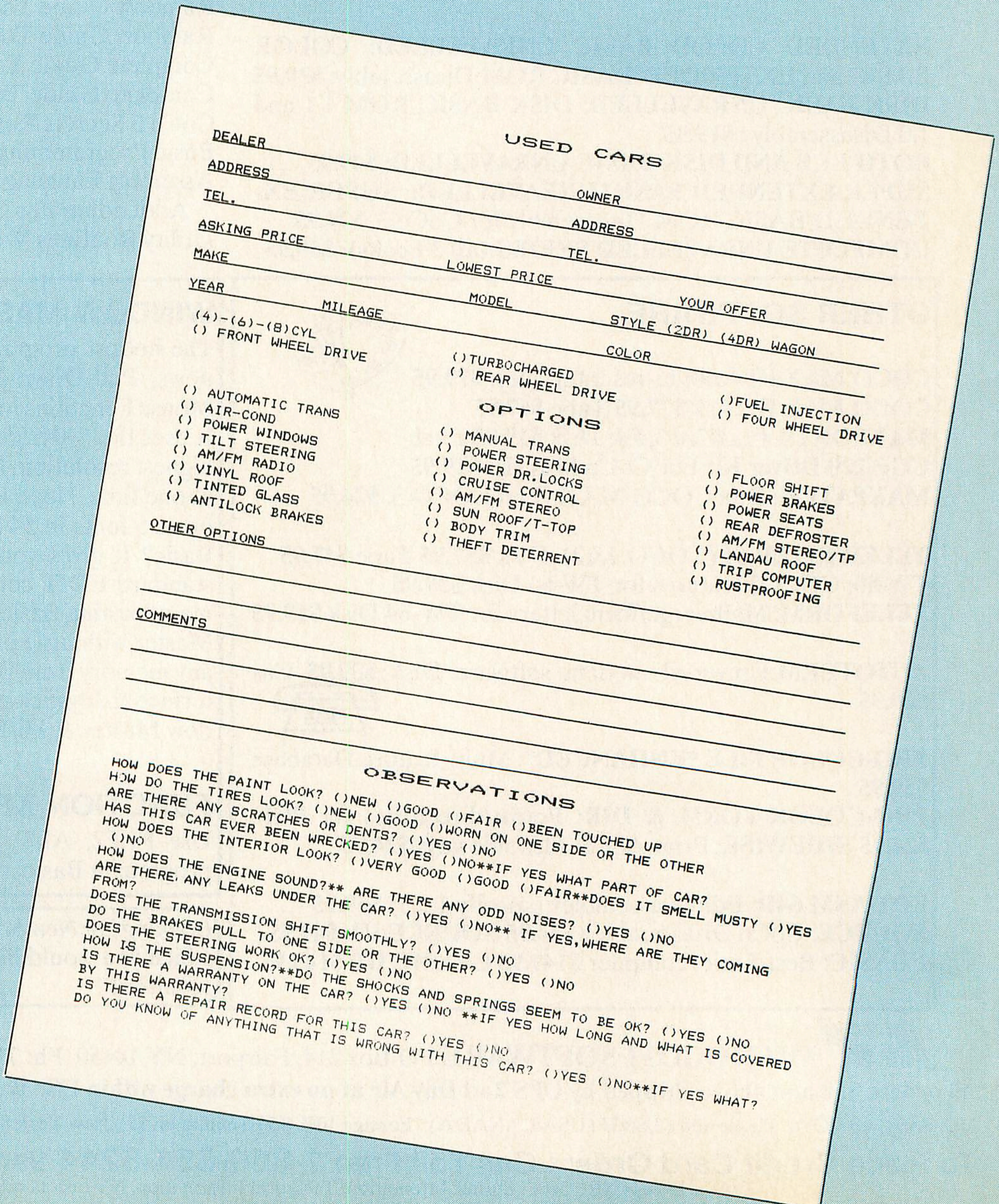
The program was written on a CoCo 3 using a Radio Shack DMP 105 printer. There's nothing fancy about it. You can use tape or disk, and it runs on a 16K machine. The one poke, in line 270, is for the 600 baud needed for the printer.

When you need a used car, you go to the lot and hope that an honest salesman will sell you a good car at a fair price. I think I have a better way.

First, decide what you can afford to spend on a used car. Next, go to your local library and look at some consumer

---

Richard Johnson, a machine operator at Corhart Refractories, enjoys both bass fishing and programming on his CoCo 3. Richard has been programming since 1985.



```
                         USED CARS
DEALER______________________OWNER__________________________
ADDRESS_____________________ADDRESS________________________
TEL.________________________TEL.___________________________
ASKING PRICE__________LOWEST PRICE__________YOUR OFFER_____
MAKE__________________MODEL_____________STYLE (2DR) (4DR) WAGON
YEAR__________MILEAGE_______________________COLOR___________
(4)-(6)-(8)CYL             ()TURBOCHARGED           ()FUEL INJECTION
() FRONT WHEEL DRIVE       () REAR WHEEL DRIVE      () FOUR WHEEL DRIVE
                           OPTIONS
() AUTOMATIC TRANS         () MANUAL TRANS          () FLOOR SHIFT
() AIR-COND                () POWER STEERING        () POWER BRAKES
() POWER WINDOWS           () POWER DR.LOCKS        () POWER SEATS
() TILT STEERING           () CRUISE CONTROL        () REAR DEFROSTER
() AM/FM RADIO             () AM/FM STEREO          () AM/FM STEREO/TP
() VINYL ROOF              () SUN ROOF/T-TOP        () LANDAU ROOF
() TINTED GLASS            () BODY TRIM             () TRIP COMPUTER
() ANTILOCK BRAKES         () THEFT DETERRENT       () RUSTPROOFING
OTHER OPTIONS______________________________________________
___________________________________________________________
___________________________________________________________
COMMENTS___________________________________________________
___________________________________________________________
___________________________________________________________
___________________________________________________________
                        OBSERVATIONS
HOW DOES THE PAINT LOOK? ()NEW ()GOOD ()FAIR ()BEEN TOUCHED UP
HOW DO THE TIRES LOOK? ()NEW ()GOOD ()WORN ON ONE SIDE OR THE OTHER
ARE THERE ANY SCRATCHES OR DENTS? ()YES ()NO
HAS THIS CAR EVER BEEN WRECKED? ()YES ()NO**IF YES WHAT PART OF CAR?
HOW DOES THE INTERIOR LOOK? ()VERY GOOD ()GOOD ()FAIR**DOES IT SMELL MUSTY ()YES
 ()NO
HOW DOES THE ENGINE SOUND?** ARE THERE ANY ODD NOISES? ()YES ()NO
ARE THERE ANY LEAKS UNDER THE CAR? ()YES ()NO** IF YES,WHERE ARE THEY COMING
FROM?
DOES THE TRANSMISSION SHIFT SMOOTHLY? ()YES ()NO
DO THE BRAKES PULL TO ONE SIDE OR THE OTHER? ()YES ()NO
DOES THE STEERING WORK OK? ()YES ()NO
HOW IS THE SUSPENSION?**DO THE SHOCKS AND SPRINGS SEEM TO BE OK? ()YES ()NO
IS THERE A WARRANTY ON THE CAR? ()YES ()NO **IF YES HOW LONG AND WHAT IS COVERED
BY THIS WARRANTY?
IS THERE A REPAIR RECORD FOR THIS CAR? ()YES ()NO
DO YOU KNOW OF ANYTHING THAT IS WRONG WITH THIS CAR? ()YES ()NO**IF YES WHAT?
```

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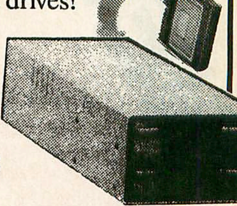

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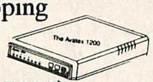
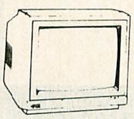


(With AVATEX 1200hc instead of Avatex 1200e: **$174.95**) with **AVATEX 2400: $249.95**

MAGNAVOX 8CM515 RGB MONITOR



Razor-sharp picture quality for your CoCo! Has 14" screen, Analog/TTL RGB, Composite inputs for CoCo 2 & 3, built-in Speaker & tilt-stand! With a push of a button you can go from RGB to composite mode. This means that ALL your CoCo programs that appear in B&W in RGB mode will appear in color!!! Only **$294** (add $12 S&H US/$40 in Canada). **FREE** Magnavox Cable for CoCo 3, Composite & Audio Cable with purchase of monitor ($24.95 value).

EPROM

INTRONICS EPROM PROGRAMMER (for CoCo): Programs 2516-27512 & more! Includes software and complete documentation. Latest Version. Lowest Price anywhere! **$137.95**

EPROM ERASER: Fast erase of 24/28 pin EPROMs. Only **$49.95**

BOTH EPROM PROGRAMMER and ERASER: $179.95

EPROMS: 2764-$8 27128-$9 each

Call for other EPROMs

ROMPAK (w/Blank PC Board 27xx Series): **$12.95**

BLANK CARTRIDGE (Disk Controller Size): Only $10.95

KEYBOARDS , ETC.

KEYBOARD EXTENSION CABLE: Move your keyboard away from the computer & type with ease. Use your existing keyboard with this cable or leave your present keyboard intact and use a second keyboard. Only **$39.95.**

Cable with CoCo II Keyboard: $49.95

CoCo 3 Keyboard (with free FUNCTION KEYS software value $14.95)**:$39.95**

CoCo 2 Keyboard: $19.95

NX-1000 Rainbow System

* Star NX-1000 Color Printer

* Serial-to-Parallel Interface

* Free Software: Signs 'N Banners and Starscan (HSCREEN2 dump in 64 col.)

Only **$289** (+$10 S&H)

CABLES

MAGNAVOX 8505/8515/8CM643 Analog RGB Cable: **$24.95**

SERIAL-TO-PARALLEL INTERFACE: Use your parallel printer at high speed (300-9600 baud) with CoCo. Comes will all cables. Only **$44.95**

15" MULTIPAK/ROMPAK EXTENDER CABLE: $29.95.

VIDEO DRIVER: Use a monochrome/color monitor with your CoCo. Comes with audio/video cables. Specify CoCo 1 or 2. Excellent picture quality/resolution! **$34.95**

RS232 Y CABLE: Hook 2 Devices to the serial port. Only **$18.95**

Y CABLE: Use your disk system with Speech Pak,CoCo Max, DS69, etc. **$27.95**

CM-8 RGB Analog Ext. Cable:$19.95

SONY Monitor Cable: $39.95

VIDEO CLEAR: Reduce TV interference.**$19.95**

MODEM CABLE:4 pin to DB25.Only **$19.95**

3-POSITION SWITCHER: $37.95

HI-RES JOYSTICK INTERFACE: $11.99

CHIPS, ETC

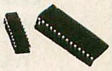
Disk Basic Rom 1.1 (Needed for CoCo 3): **$29.95** **ECB ROM 1.1:$29.95**

68B09E or 6809E Chip: $14.95

MultiPak PAL Chip for CoCo 3: **$19.95**

PAL Switcher: Now you can switch between the CoCo 2 and 3 modes when using the Multi-Pak. You need the OLDER & NEW PAL chip for the 26-3024 Multipak. Only $39.95. With NEW PAL Chip: **$49.95.**

5 1/4" Disks: $0.45 each!



UPGRADES

512K Upgrades for CoCo 3: **$CALL**

64K Upgrade for CoCo I's, CoCo II's with Cat #26-3026/27, 26-3134, 26-3136: **$29.95**

64K Upgrade for 26-3134 A/B CoCo II: **$39.95**

MICROCOM SOFTWARE PO Box 214, Fairport, NY 14450 Ph: 716-223-1477 VISA MasterCard AMERICAN EXPRESS

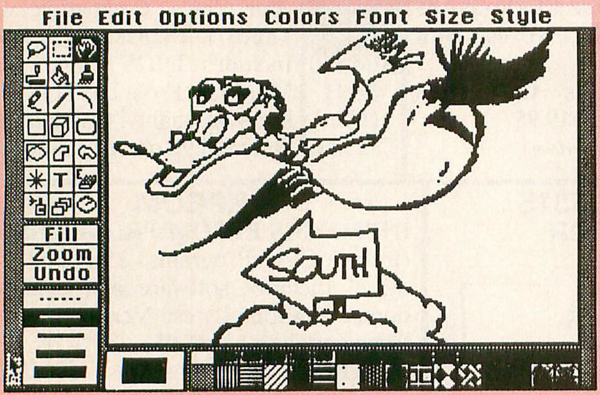
All orders $50 & above (except drives, monitors & printers) shipped by UPS 2nd Day Air at no extra charge within US. We accept Visa, MasterCard, Amex, Check or MO. Sorry, no CODs. Please add $3 S&H (USA/CANADA); except where specified otherwise; Foreign 10% S&H(minimum $5). New York State residents please add sales tax.

To Place Credit Card Orders Call Toll Free 1-800-654-5244 9am-9pm EST 7 days /week

Except NY. Order Status, Infomation, Technical Information, NY orders call 716-223-1477

NEW REAL DESKTOP

CoCo Max™ III AND



CoCo Max III is absolutely the best drawing package available for the CoCo 3, and it does more than just let you draw. **CoCo Max III** includes animation, text, color mixing and more features than you would think possible. It combines incredible speed with dazzling graphics and it is a joy to use even its most powerful features.

Pictures, graphs, flyers, cards, signs, school projects, labels, buttons and anything else you might dream of creating is now possible with **CoCo Max III**. Is it any wonder that the majority of CoCo Gallery pictures in the last five months were created with **CoCo Max?**

Thousands of CoCo users have found that you don't have to be an artist to have fun with **CoCo Max**. You'll wonder why you waited so long to get the incredible **CoCo Max III**.

CoCo Max III is the best because it includes:

– a huge picture area (*two* full hi-res 320x192 screens) – a large editing window – Zoom mode for detail work – 28 drawing tools which you just point and click on – shrink and stretch – rotation at any angle (1.5 degree steps) – 512K memory support (*all* features work with 128K too) – an Undo feature to correct mistakes – you can even Undo an "Undo" – Animation – special effects – color sequencing (8 colors, variable speed) – thirteen fonts (more available) – each font has eight different sizes – five style options (bold, italic, 3D, etc.) for thousands of font/size/style combination possibilities. – the CoCo Show "slide show" program – color editing of patterns – automatic pattern alignment – prints in single and double size – smart lasso (move text over a background...) – advanced tools: arc, ray, cube, etc. – select 16 of the 64 colors (all 64 colors are displayed at once for selection!) – picture converter (CoCo Max II, MGE, BASIC) – extensive prompting – "glyphic" clipbook of rubber stamps – double click shortcuts – color mixing (additive/subtractive/none) – money back guarantee – sophisticated data compression saves disk space – pull down menus (no commands to remember) – forty paintbrush shapes – two color lettering – spray can – scrapbooks of pictures – error free – Y-cable or multipack not required – high speed hi-res interface included (plugs into joystick port) – disk is not copy protected – amazing "flowbrush" – RGB and composite monitor support – replace color – printing on black and white printers in five shades of gray – full color printing with optional drivers for the NX-1000 Rainbow and CGP220 – entirely rewritten for the CoCo 3

> There are no limits to what you can do with this fabulous program. Speed, ease, animation, power and color, all in one package. **CoCo Max III** is the ultimate program for the CoCo 3. –Rainbow review 4/88

CoCo Max III: $79.95

Max-10 owners: deduct $10

System Requirements:
CoCo 3 disk system and a Joystick or Mouse

Printer drivers included:
IBM/Epson and compatibles, GEMINI, DMP105/106/130,OKI182/192, CGP220 (B&W), DMP110, DMP200

Color printer drivers (prints 125 different colors) Star NX-1000, CGP-220, or Okimate 20 each **$19.95**

For all CoCo Max Versions

Max Edit Font Editor: A font is a set of characters of a particular style. With Max Edit you can create new fonts or modify the existing ones. **$19.95**

Max Font disks (send for list) each **$19.95**

Max Font Set (95 fonts on 4 disks) **$49.95**

DS69/69B Digitizers: allows you to capture the image from a VCR or video camera and bring it into your computer. CoCo Max will let you load digitized pictures and modify them.

DS-69 (2 images per second. Requires multipak) **$99.95**

DS-69B (8 images/second) **$149.95**

CoCo 1 & 2 Owners Still Available:

(See previous ads or write for information)

CoCo Max II (works on all disk CoCos) **$69.95**

CoCo Max Tape (CoCo 1 & 2 only) **$59.95**

Y-Cable **$24.95**

CoCo Max II Picture Disk Set set of 3 disks: **$29.95**

Guaranteed Satisfaction

Use CoCo Max or Max-10 for a full month. If you are not delighted with either of them, we will refund every penny.

COLORWARE

A division of Sigma Industries, Inc.

TO ORDER

(203) 656-1806 MON-FRI 9 to 5 EST

Visa or Mastercard accepted. C.O.D. orders $3 extra
Check or M.O. to: Colorware, 242-W West Ave, Darien CT 06820
Add $3 per order for shipping ($5 to Canada, 10% to overseas)
CT residents add 7.5% sales tax

PUBLISHING

COLORWARE

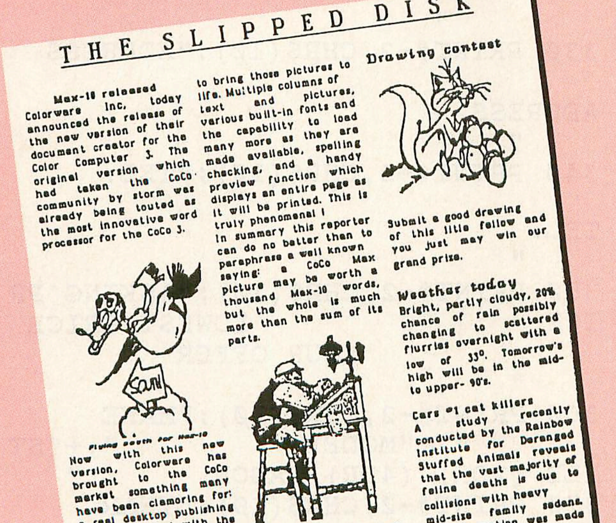
Max-10™

THE DAZZLING WORD PROCESSOR

You probably already have a word processor, and you probably wish it had these features:

- ► Fully menu driven (CoCo Max style) with point and click marking of text. You don't need the arrow keys!
- ► True WYSIWYG (What You See Is What You Get) including variable size fonts, styles (bold, italics, etc.) and graphics.
- ► Can print multiple columns on a page.
- ► Not limited by printer capabilities: fonts up to 24 points (1/3") high, superscripts, small print, etc.
- ► Fully integrated spelling checker (incredibly fast), no need to exit program to check spelling.
- ► Graphics can be imported from just about anything (CoCo Max; MGE; BASIC; even Macintosh pictures from a BBS) and resized to fit your document.
- ► Full screen preview including graphics.

Max-10 has all these unique features, plus all the features you are used to in your current word processor. Even with all this, you don't give up anything. **Max-10** is easier to use, more intuitive, faster and more powerful than anything else. It's not just a word processor, it's a desktop publisher.



THE SLIPPED DISK

Max-10 released Colorware Inc. today announced the release of the new version of their document creator for the Color Computer 3. The original version which had taken the CoCo community by storm was already being touted as the most innovative word processor for the CoCo 3.

Flying south for Max-10

Now with this new version, Colorware has brought to the CoCo market something many have been clamoring for: a real desktop publishing system. Coupled with the already sensational CoCo Max III color graphic creator and editor, the new Max-10 can add words to bring those pictures to life. Multiple columns of text and pictures, various built-in fonts and the capability to load many more as they are made available, spelling checking, and a handy preview function which displays an entire page as it will be printed. This is truly phenomenal ! In summary this reporter can do no better than to paraphrase a well known CoCo Max saying: a picture may be worth a thousand Max-10 words, but the whole is much more than the sum of its parts.

Author Dave Stoops at work

Drawing contest

Submit a good drawing of this litle fellow and you just may win our grand prize.

Weather today

Bright, partly cloudy, 20% chance of rain possibly changing to scattered flurries overnight with a low of 33°. Tomorrow's high will be in the mid- to upper- 90's.

Cars #1 cat killers

A study recently conducted by the Rainbow Institute for Deranged Stuffed Animals reveals that the vast majority of feline deaths is due to collisions with heavy mid-size family sedans. No information was made

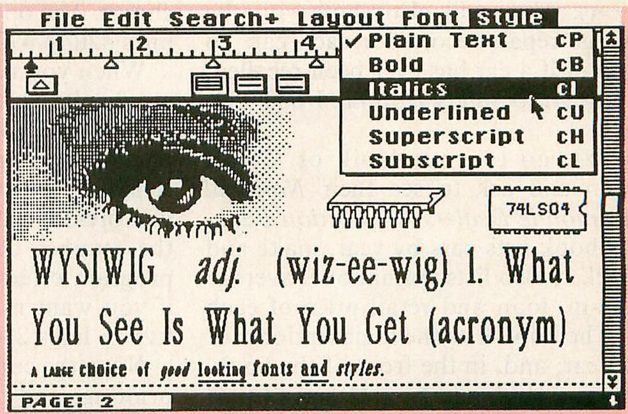
PAGE 1

Max-10: $79.95

CoCo Max III owners: deduct $10

Max-10 requires a CoCo 3, at least 1 disk, & joystick or mouse

Printer drivers included: IBM/Epson and compatibles; DMP 105, DMP106, DMP130; CGP220 (B&W); Gemini/Star



WYSIWIG *adj.* (wiz-ee-wig) 1. What You See Is What You Get (acronym)

A LARGE choice of *good* looking fonts and *styles.*

Some of the many features of **Max-10:**

– Blinding speed – printing in multiple columns – online dictionary – spell checking – graphics can be mixed with text – full justification of proportionally sized characters – bold, italic, underline superscript and subscript type styles – superb file support, just point and click – "Undo" lets you correct mistakes – easy to use, no commands to remember – any graphics program can be used – pictures can be shrunk or stretched to fit – right and left alignment – centering – variable line spacing – page numbering – current page number displayed on the screen – variable tab stops – left and right margins – tabs and margins can vary in the same document – cut and paste text and graphics anywhere in the file – page break shows on the screen – pull down menus are quick and simple to use – lightning fast access to any point in the document with the scroll box – twenty fonts (styles and sizes), more available – any number of character sizes and styles can be mixed on the same line – up to more than 120 characters per line, depending on font size, style and letters – headers and footers, even with graphics – file compatibility with other word processors – right, left, bottom and top margins – word wrap – set starting page – type ahead – key repeat – key click – scroll up and down – ASCII file output for compatibility – disk directory – kill files– block cut, copy and move – global search and replace – paragraph indent – clipboard – merge – show file (on disk) – free memory display – page count – paragraph count – word count – graphics can be resized and moved – multiple fonts – error recovery – true lowercase – 512K memory support (all features work with 128K too) – complete point and click cursor control – moving, clearing and changing blocks of text is ridiculously easy, just point and click at each end of the text block – onscreen ruler – preview file before loading – search and replace – disk is not copy protected – more than 35 pages of text

CoCo Max III and Max–10 Perfect Together

You do not *need* **CoCo Max III** to insert and print graphics in **Max–10**. Max–10 works with any graphics creation program, and you can also use graphics downloaded from bulletin boards.

Similarly, you do not *need* **Max–10** to create graphics with text in **CoCo Max III**. There are tremendous lettering capabilities in **CoCo Max III**, with its many fonts, styles, and sizes.

Together **Max–10** and **CoCo Max III** are an unbeatable combination. This desktop publishing system is better than anything you've ever seen on a CoCo. We are so confident that you will use, and enjoy using the two software packages, that we offer an unconditional money back guarantee. Stop wasting your time and effort using inferior or obsolete products. Move up to the new generation of CoCo software now.

magazines. There are several; check them all out. These magazines will tell you which used cars are the best ones to buy. They will also show you the average repair record for each car. To find out if a car has ever been recalled, call the *Auto Safety Hotline*, 1-800-424-9393.

Next, go to your bank or Credit Union and ask to see their *National Automobile Dealers Association Book*. This book lists cars by year, make and model. It also lists the national average trade-in, loan and retail price of each car. The book lists the main options for each car; and, in the front of the book, there is a High and Low Mileage Chart for each year.

Once you know the car or cars that interest you, change the option section of the program to match your car choice. The option section is located in lines 420 to 490.

When you run *Used Cars* the credits are displayed. After a few seconds, the program will remind you to start the paper at the top of the printer head and to make sure the printer is online. After you press ENTER, you will be asked for the number of copies you want. The program offers one to five copies, but if you want more you can change the five in lines 240 and 250 to any value.

Now, the computer tells you that it is printing, and the printer will print all the copies you requested.

Following are the printer codes used:

`CHR$(27)`=Escape code
`CHR$(10)`=Executive line feed
`CHR$(27);CHR$(14)`=Start elongation
`CHR$(27);CHR$(15)`=End elongation
`CHR$(15)`=Start underline
`CHR$(14)`=End underline
`CHR$(19)`=Standard print

The forms printed out should be used as you look at the cars. Fill each out completely and ask all the questions at the bottom of the page. Good luck!!!

(Questions or comments regarding this program may be directed to the author at 826 Elmwood Ave., New Albany, IN 47150. Please enclose an SASE when requesting a reply.) ☐

210 173	590 90
340 23	680 167
430 222	END 44
490 33	

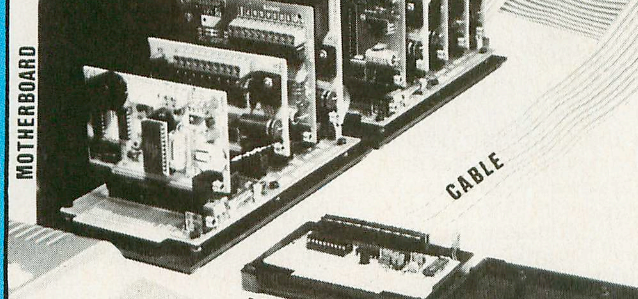
The listing: USEDCARS

```
10 REM $$$$$$$$$$$$$$$$$$$$$$$$$
20 REM $$$     USED CARS     $$$
30 REM $$$        BY         $$$
40 REM $$$ RICHARD K.JOHNSON $$$
50 REM $$$  826 ELMWOOD AVE. $$$
60 REM $$$   NEW ALBANY,IN.  $$$
70 REM $$$       47150       $$$
80 REM $$$     APRIL 88      $$$
90 REM $$$$$$$$$$$$$$$$$$$$$$$$$
100 CLS:PRINT@101,"$$$$$$$$$$$$$
$$$$$$$$$"
110 PRINT@133,"$
    $"
120 PRINT@165,"$     USED CARS
    $"
130 PRINT@197,"$
    $"
140 PRINT@229,"$        BY
    $"
150 PRINT@261,"$
    $"
160 PRINT@293,"$ RICHARD K. JOHN
SON $"
170 PRINT@325,"$
    $"
180 PRINT@357,"$$$$$$$$$$$$$$$$$
$$$$$"
190 FORP=1TO2000:NEXTP
200 CLS:PRINT"SET PAPER TO TOP O
F PRINTER HEAD"
210 PRINT"  WHEN PRINTER IS ON L
INE PRESS           <<<ENTER>>>"
220 EXEC44539
230 IF INKEY$=CHR$(13)THEN 240EL
SE200
240 CLS:INPUT"HOW MANY COPIES (1
-5)";C
250 IFC<1 OR C>5 THEN240 ELSE260
260 PR=1
270 POKE150,87'POKE FOR 600 BAUD
 RATE FOR RADIO SHACK DMP 105 PR
INTER
280 FORPR=1 TO C
290 CLS:PRINT@234,"NOW PRINTING"
300 A$="USED CARS"
310 PRINT#-2,CHR$(27);CHR$(14);T
AB((45-LEN(A$))/2);A$;CHR$(10);C
HR$(10)
320 PRINT#-2,CHR$(27);CHR$(15);C
HR$(15);CHR$(27);CHR$(19);"DEALE
R
    OWNER
        "
330 PRINT#-2,CHR$(10);"ADDRESS

ADDRESS
    "
340 PRINT#-2,CHR$(10);"TEL.

TEL.
    "
350 PRINT#-2,CHR$(10);"ASKING PR
ICE                LOWEST PRICE
             YOUR OFFER
    "
360 PRINT#-2,CHR$(10);"MAKE
       ",+"MODEL          ",+"ST
YLE (2DR) (4DR) WAGON       "
370 PRINT#-2,CHR$(10);"YEAR
     ",+"MILEAGE           ",+"C
OLOR                        ":PR
INT#-2,CHR$(14)
380 PRINT#-2,TAB(1);"(4)-(6)-(8)
CYL";:PRINT#-2,TAB(30);"()TURBOC
HARGED";:PRINT#-2,TAB(60);"()FUE
L INJECTION"
```

The Amazing A-BUS

NEW

Plug into the future



An A-BUS system with two Motherboards
A-BUS adapter in foreground

The A-BUS system works with the original CoCo, the CoCo 2 and the CoCo 3.

With the A-BUS you can plug your PC (IBM, Apple, TRS-80) into a future of exciting new applications in the fields of control, monitoring, automation, sensing, robotics, etc.

Alpha's modular A-BUS offers a proven method to build your "custom" system today. Tomorrow, when you are ready to take another step, you will be able to add more functions. This is ideal for first time experimenting and teaching.

A-BUS control can be entirely done in simple BASIC or Pascal, and no knowledge of electronics is required!

An A-BUS system consists of the A-BUS adapter plugged into your computer and a cable to connect the Adapter to 1 or 2 A-BUS cards. The same cable will also fit an A-BUS Motherboard for expansion up to 25 cards in any combination.

The A-BUS is backed by Alpha's continuing support (our 11th year, 50000 customers in over 60 countries).

The complete set of A-BUS User's Manuals is available for $10.

About the A-BUS system:

- All the A-BUS cards are very easy to use with any language that can read or write to a Port or Memory. In BASIC, use INP and OUT (or PEEK and POKE with Apples and Tandy Color Computers)
- They are all compatible with each other. You can mix and match up to 25 cards to fit your application. Card addresses are easily set with jumpers.
- A-BUS cards are shipped with power supplies (except PD-123) and detailed manuals (including schematics and programming examples).

Relay Card RE-140: $129

Includes eight industrial relays, (3 amp contacts, SPST) individually controlled and latched. 8 LED's show status. Easy to use (OUT or POKE in BASIC). Card address is jumper selectable.

Reed Relay Card RE-156: $99

Same features as above, but uses 8 Reed Relays to switch low level signals (20mA max). Use as a channel selector, solid state relay driver, etc.

Analog Input Card AD-142: $129

Eight analog inputs. 0 to +5V range can be expanded to 100V by adding a resistor. 8 bit resolution (20mV). Conversion time 120us. Perfect to measure voltage, temperature, light levels, pressure, etc. Very easy to use.

12 Bit A/D Converter AN-146: $139

This analog to digital converter is accurate to .025%. Input range is −4V to +4V. Resolution: 1 millivolt. The on board amplifier boosts signals up to 50 times to read microvolts. Conversion time is 130ms. Ideal for thermocouple, strain gauge, etc. 1 channel. (Expand to 8 channels using the RE-156 card).

Digital Input Card IN-141: $59

The eight inputs are optically isolated, so it's safe and easy to connect any "on/off" devices, such as switches, thermostats, alarm loops, etc. to your computer. To read the eight inputs, simply use BASIC INP (or PEEK).

24 Line TTL I/O DG-148: $65

Connect 24 input or output signals (switches or any TTL device) to your computer. The card can be set for: input, latched output, strobed output, strobed input, and/or bidirectional strobed I/O. Uses the 8255A chip.

Clock with Alarm CL-144: $89

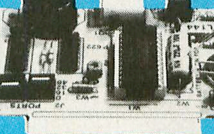
Powerful clock/calendar with: battery backup for Time, Date and Alarm setting (time and date); built in alarm relay, led and buzzer; timing to 1/100 second. Easy to use decimal format. Lithium battery included.

Touch Tone® Decoder PH-145: $79

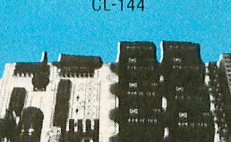
Each tone is converted into a number which is stored on the board. Simply read the number with INP or POKE. Use for remote control projects, etc.

A-BUS Prototyping Card PR-152: $15

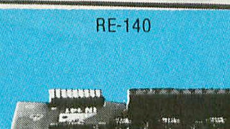
3½ by 4½ in. with power and ground bus. Fits up to 10 I.C.s



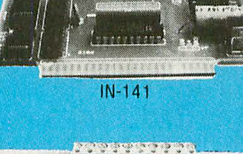
ST-143



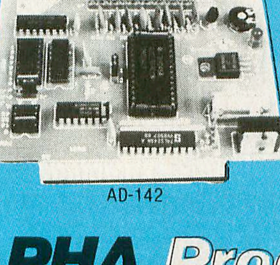
CL-144



RE-140



IN-141



AD-142

Smart Stepper Controller SC-149: $299

World's finest stepper controller. On board microprocessor controls 4 motors simultaneously. Incredibly, it accepts plain English commands like "Move arm 10.2 inches left". Many complex sequences can be defined as "macros" and stored in the on board memory. For each axis, you can control: coordinate (relative or absolute), ramping, speed, step type (half, full, wave), scale factor, units, holding power, etc. Many inputs: 8 limit & "wait until" switches, panic button, etc. On the fly reporting of position, speed, etc. On board drivers (350mA) for small steppers (MO-103). Send for SC-149 flyer.

Remote Control Keypad Option RC-121: $49
To control the 4 motors directly, and "teach" sequences of motions.

Power Driver Board Option PD-123: $89
Boost controller drive to 5 amps per phase. For two motors (eight drivers).

Breakout Board Option BB-122: $19
For easy connection of 2 motors. 3 ft. cable ends with screw terminal board.

Stepper Motor Driver ST-143: $79

Stepper motors are the ultimate in motion control. The special package (below) includes everything you need to get familiar with them. Each card drives two stepper motors (12V, bidirectional, 4 phase, 350mA per phase).

Special Package: 2 motors (MO-103) + ST-143: **PA-181: $99**

Stepper Motors MO-103: $15 or 4 for $39

Pancake type, 2¼" dia, ¼" shaft, 7.5°/step. 4 phase bidirectional, 300 step/sec, 12V, 36 ohm, bipolar, 5 oz-in torque, same as Airpax K82701-P2.

Current Developments

Intelligent Voice Synthesizer, 14 Bit Analog to Digital converter, 4 Channel Digital to Analog converter, Counter Timer, Voice Recognition.

A-BUS Adapters for:

IBM PC, XT, AT and compatibles. Uses one short slot.	AR-133...$69
Tandy 1000, 1000 EX & SX, 1200, 3000. Uses one short slot.	AR-133...$69
Apple II, II+, IIe. Uses any slot.	AR-134...$49
TRS-80 Model 102, 200 Plugs into 40 pin "system bus".	AR-136...$69
Model 100. Uses 40 pin socket. (Socket is duplicated on adapter).	AR-135...$69
TRS-80 Mod 3,4,4D. Fits 50 pin bus. (With hard disk, use Y-cable).	AR-132...$49
TRS-80 Model 4P. Includes extra cable. (50 pin bus is recessed).	AR-137...$62
TRS-80 Model I. Plugs into 40 pin I/O bus on KB or E/I.	AR-131...$39
Color Computers (Tandy). Fits ROM slot. Multipak, or Y-cable.	AR-138...$49

A-BUS Cable (3 ft, 50 cond.) CA-163: $24

Connects the A-BUS adapter to one A-BUS card or to first Motherboard.

Special cable for two A-BUS cards: CA-162: $34

A-BUS Motherboard MB-120: $99

Each Motherboard holds five A-BUS cards. A sixth connector allows a second Motherboard to be added to the first (with connecting cable CA-161: $12). Up to five Motherboards can be joined this way to a single A-BUS adapter. Sturdy aluminum frame and card guides included.

- The A-BUS is not a replacement for the Multi-pak

Add $3.00 per order for shipping.
Visa, MC, checks, M.O. welcome.
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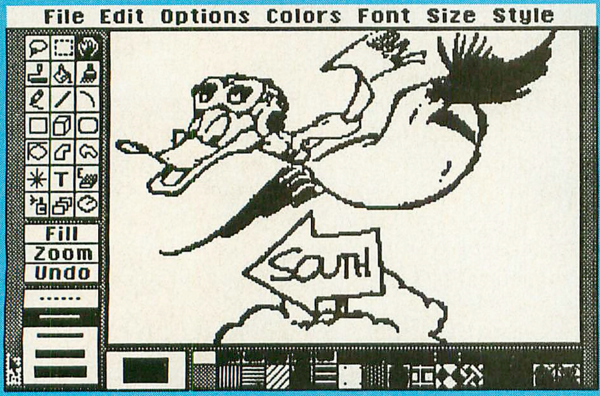
Orders only Except in CT **800 221-0916**
Connecticut orders: **(203) 348-9436**
All lines open weekdays 9 to 5 Eastern time

NEW REAL DESKTOP

CoCo Max™ III AND



CoCo Max III is absolutely the best drawing package available for the CoCo 3, and it does more than just let you draw. **CoCo Max III** includes animation, text, color mixing and more features than you would think possible. It combines incredible speed with dazzling graphics and it is a joy to use even its most powerful features.

Pictures, graphs, flyers, cards, signs, school projects, labels, buttons and anything else you might dream of creating is now possible with **CoCo Max III**. Is it any wonder that the majority of CoCo Gallery pictures in the last five months were created with **CoCo Max?**

Thousands of CoCo users have found that you don't have to be an artist to have fun with **CoCo Max**. You'll wonder why you waited so long to get the incredible **CoCo Max III**.

CoCo Max III is the best because it includes:

- a huge picture area (*two* full hi-res 320x192 screens) - a large editing window - Zoom mode for detail work - 28 drawing tools which you just point and click on - shrink and stretch - rotation at any angle (1.5 degree steps) - 512K memory support (*all* features work with 128K too) - an Undo feature to correct mistakes - you can even Undo an "Undo" - Animation - special effects - color sequencing (8 colors, variable speed) - thirteen fonts (more available) - each font has eight different sizes - five style options (bold, italic, 3D, etc.) for thousands of font/size/style combination possibilities. - the CoCo Show "slide show" program - color editing of patterns - automatic pattern alignment - prints in single and double size - smart lasso (move text over a background...) - advanced tools: arc, ray, cube, etc. - select 16 of the 64 colors (all 64 colors are displayed at once for selection!) - picture converter (CoCo Max II, MGE, BASIC) - extensive prompting - "glyphic" clipbook of rubber stamps - double click shortcuts - color mixing (additive/subtractive/none) - money back guarantee - sophisticated data compression saves disk space - pull down menus (no commands to remember) - forty paintbrush shapes - two color lettering - spray can - scrapbooks of pictures - error free - Y-cable or multipack not required - high speed hi-res interface included (plugs into joystick port) - disk is not copy protected - amazing "flowbrush" - RGB and composite monitor support - replace color - printing on black and white printers in five shades of gray - full color printing with optional drivers for the NX-1000 Rainbow and CGP220 - entirely rewritten for the CoCo 3

> There are no limits to what you can do with this fabulous program. Speed, ease, animation, power and color, all in one package. **CoCo Max III** is the ultimate program for the CoCo 3. -Rainbow review 4/88

CoCo Max III: $79.95
Max-10 owners: deduct $10

System Requirements:
CoCo 3 disk system and a Joystick or Mouse

Printer drivers included:
IBM/Epson and compatibles, GEMINI, DMP105/106/130,OKI182/192, CGP220 (B&W), DMP110, DMP200

Color printer drivers (prints 125 different colors) Star NX-1000, CGP-220, or Okimate 20 each **$19.95**

For all CoCo Max Versions

Max Edit Font Editor: A font is a set of characters of a particular style. With Max Edit you can create new fonts or modify the existing ones. **$19.95**

Max Font disks (send for list) each **$19.95**

Max Font Set (95 fonts on 4 disks) **$49.95**

DS69/69B Digitizers: allows you to capture the image from a VCR or video camera and bring it into your computer. CoCo Max will let you load digitized pictures and modify them.

DS-69 (2 images per second. Requires multipak) **$99.95**

DS-69B (8 images/second) **$149.95**

CoCo 1 & 2 Owners
Still Available:
(See previous ads or write for information)

CoCo Max II (works on all disk CoCos) **$69.95**

CoCo Max Tape (CoCo 1 & 2 only) **$59.95**

Y-Cable **$24.95**

CoCo Max II Picture Disk Set
set of 3 disks: **$29.95**

Guaranteed Satisfaction
Use CoCo Max or Max-10 for a full month.
If you are not delighted with either of them,
we will refund every penny.

COLORWARE
A division of Sigma Industries, Inc.

TO ORDER
(203) 656-1806 MON-FRI 9 to 5 EST
Visa or Mastercard accepted. C.O.D. orders $3 extra
Check or M.O. to: Colorware, 242-W West Ave, Darien CT 06820
Add $3 per order for shipping ($5 to Canada, 10% to overseas)
CT residents add 7.5% sales tax

PUBLISHING

COLORWARE

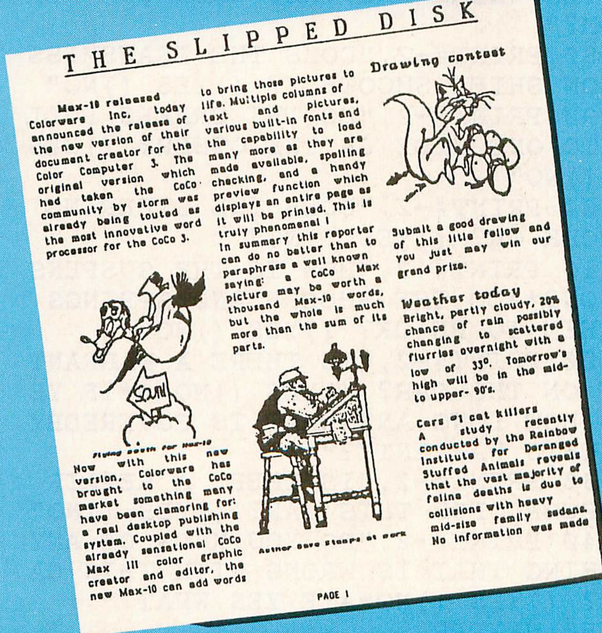
Max-10™

THE DAZZLING WORD PROCESSOR

You probably already have a word processor, and you probably wish it had these features:

- ► Fully menu driven (CoCo Max style) with point and click marking of text. You don't need the arrow keys!
- ► True WYSIWYG (What You See Is What You Get) including variable size fonts, styles (bold, italics, etc.) and graphics.
- ► Can print multiple columns on a page.
- ► Not limited by printer capabilities: fonts up to 24 points (1/3") high, superscripts, small print, etc.
- ► Fully integrated spelling checker (incredibly fast), no need to exit program to check spelling.
- ► Graphics can be imported from just about anything (CoCo Max; MGE; BASIC; even Macintosh pictures from a BBS) and resized to fit your document.
- ► Full screen preview including graphics.

Max-10 has all these unique features, plus all the features you are used to in your current word processor. Even with all this, you don't give up anything. **Max-10** is easier to use, more intuitive, faster and more powerful than anything else. It's not just a word processor, it's a desktop publisher.



THE SLIPPED DISK

Max-10 released

Colorware Inc, today announced the release of the new version of their document creator for the Color Computer 3. The original version which had taken the CoCo community by storm was already being touted as the most innovative word processor for the CoCo 3.

Flying south for Max-10

Now with this new version, Colorware has brought to the CoCo market something many have been clamoring for: a real desktop publishing system. Coupled with the already sensational CoCo Max III color graphic creator and editor, the new Max-10 can add words to bring those pictures to life. Multiple columns of text and pictures, various built-in fonts and the capability to load many more as they are made available, spelling checking, and a handy preview function which displays an entire page as it will be printed. This is truly phenomenal !

In summary this reporter can do no better than to paraphrase a well known CoCo Max saying: a picture may be worth a thousand Max-10 words, but the whole is much more than the sum of its parts.

Author Dave Stoops at work

Drawing contest

Submit a good drawing of this litle fellow and you just may win our grand prize.

Weather today

Bright, partly cloudy, 20% chance of rain possibly changing to scattered flurries overnight with a low of 33°. Tomorrow's high will be in the mid- to upper- 90's.

Cars #1 cat killers

A study recently conducted by the Rainbow Institute for Deranged Stuffed Animals reveals that the vast majority of feline deaths is due to collisions with heavy mid-size family sedans. No information was made

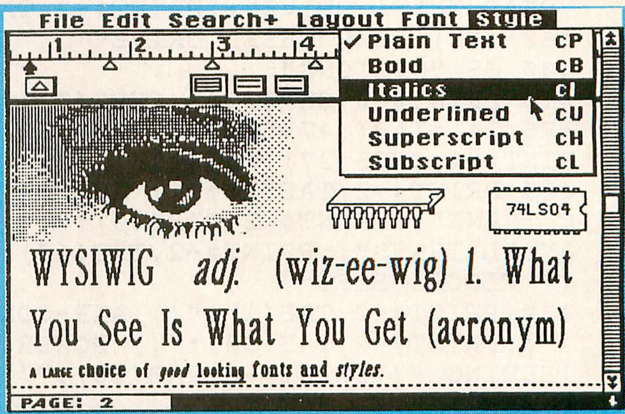
PAGE 1

Max-10: $79.95

CoCo Max III owners: deduct $10

Max-10 requires a CoCo 3, at least 1 disk, & joystick or mouse

Printer drivers included: IBM/Epson and compatibles; DMP 105, DMP106, DMP130; CGP220 (B&W); Gemini/Star



WYSIWIG *adj.* (wiz-ee-wig) 1. What You See Is What You Get (acronym)

A LARGE choice of *good* looking fonts and *styles*.

Some of the many features of **Max-10:**

- Blinding speed - printing in multiple columns - online dictionary - spell checking - graphics can be mixed with text - full justification of proportionally sized characters - bold, italic, underline superscript and subscript type styles - superb file support, just point and click - "Undo" lets you correct mistakes - easy to use, no commands to remember - any graphics program can be used - pictures can be shrunk or stretched to fit - right and left alignment - centering - variable line spacing - page numbering - current page number displayed on the screen - variable tab stops - left and right margins - tabs and margins can vary in the same document - cut and paste text and graphics anywhere in the file - page break shows on the screen - pull down menus are quick and simple to use - lightning fast access to any point in the document with the scroll box - twenty fonts (styles and sizes), more available - any number of character sizes and styles can be mixed on the same line - up to more than 120 characters per line, depending on font size, style and letters - headers and footers, even with graphics - file compatibility with other word processors - right, left, bottom and top margins - word wrap - set starting page - type ahead - key repeat - key click - scroll up and down - ASCII file output for compatibility - disk directory - kill files- block cut, copy and move - global search and replace - paragraph indent - clipboard - merge - show file (on disk) - free memory display - page count - paragraph count - word count - graphics can be resized and moved - multiple fonts - error recovery - true lowercase - 512K memory support (all features work with 128K too) - complete point and click cursor control - moving, clearing and changing blocks of text is ridiculously easy, just point and click at each end of the text block - onscreen ruler - preview file before loading - search and replace - disk is not copy protected - more than 35 pages of text

CoCo Max III and Max-10 Perfect Together

You do not *need* **CoCo Max III** to insert and print graphics in **Max-10**. Max-10 works with any graphics creation program, and you can also use graphics downloaded from bulletin boards.

Similarly, you do not *need* **Max-10** to create graphics with text in **CoCo Max III**. There are tremendous lettering capabilities in **CoCo Max III**, with its many fonts, styles, and sizes.

Together **Max-10** and **CoCo Max III** are an unbeatable combination. This desktop publishing system is better than anything you've ever seen on a CoCo. We are so confident that you will use, and enjoy using the two software packages, that we offer an unconditional money back guarantee. Stop wasting your time and effort using inferior or obsolete products. Move up to the new generation of CoCo software now.

```
390 PRINT#-2,TAB(1);"() FRONT WH
EEL DRIVE";:PRINT#-2,TAB(30);"()
 REAR WHEEL DRIVE";:PRINT#-2,TAB
(60);"() FOUR WHEEL DRIVE"
400 B$="OPTIONS"
410 PRINT#-2,CHR$(10);CHR$(27);C
HR$(14);TAB((47-LEN(B$))/2);B$:P
RINT#-2,CHR$(27);CHR$(15)
420 PRINT#-2,TAB(1);"() AUTOMATI
C TRANS";:PRINT#-2,TAB(30);"() M
ANUAL TRANS";:PRINT#-2,TAB(60);"
() FLOOR SHIFT"
430 PRINT#-2,TAB(1);"() AIR-COND
 ";:PRINT#-2,TAB(30);"() POWER S
TEERING ";:PRINT#-2,TAB(60);"()
POWER BRAKES "
440 PRINT#-2,TAB(1);"() POWER WI
NDOWS ";:PRINT#-2,TAB(30);"() PO
WER DR.LOCKS ";:PRINT#-2,TAB(60)
;"() POWER SEATS "
450 PRINT#-2,TAB(1);"() TILT STE
ERING";:PRINT#-2,TAB(30);"() CRU
ISE CONTROL";:PRINT#-2,TAB(60);"
() REAR DEFROSTER"
460 PRINT#-2,TAB(1);"() AM/FM RA
DIO";:PRINT#-2,TAB(30);"() AM/FM
 STEREO";:PRINT#-2,TAB(60);"() A
M/FM STEREO/TP"
470 PRINT#-2,TAB(1);"() VINYL RO
OF";:PRINT#-2,TAB(30);"() SUN RO
OF/T-TOP";:PRINT#-2,TAB(60);"()
LANDAU ROOF"
480 PRINT#-2,TAB(1);"() TINTED G
LASS";:PRINT#-2,TAB(30);"() BODY
 TRIM";:PRINT#-2,TAB(60);"() TRI
P COMPUTER"
490 PRINT#-2,TAB(1);"() ANTILOCK
 BRAKES";:PRINT#-2,TAB(30);"() T
HEFT DETERRENT";:PRINT#-2,TAB(60
);"() RUSTPROOFING"
500 PRINT#-2
510 PRINT#-2,CHR$(15);"OTHER OPT
IONS

        "
 520 PRINT#-2:PRINT#-2,"


        "
 530 PRINT#-2:PRINT#-2,"


        "
 540 PRINT#-2:PRINT#-2,"COMMENTS


        "
 550 PRINT#-2:PRINT#-2,"

        "
560 PRINT#-2:PRINT#-2,"


        "
570 PRINT#-2:PRINT#-2,"


        "
580 PRINT#-2,CHR$(14)
590 C$="OBSERVATIONS"
600 PRINT#-2,CHR$(27);CHR$(14);T
AB((44-LEN(C$))/2);C$:PRINT#-2,C
HR$(27);CHR$(15)
610 PRINT#-2,CHR$(27);CHR$(19);"
HOW DOES THE PAINT LOOK? ()NEW (
)GOOD ()FAIR ()BEEN TOUCHED UP"
620 PRINT#-2,"HOW DO THE TIRES L
OOK? ()NEW ()GOOD ()WORN ON ONE
SIDE OR THE OTHER"
630 PRINT#-2,"ARE THERE ANY SCRA
TCHES OR DENTS? ()YES ()NO"
640 PRINT#-2,"HAS THIS CAR EVER
BEEN WRECKED? ()YES ()NO**IF YES
 WHAT PART OF CAR?"
650 PRINT#-2,"HOW DOES THE INTER
IOR LOOK? ()VERY GOOD ()GOOD ()F
AIR**DOES IT SMELL MUSTY ()YES (
)NO
660 PRINT#-2,"HOW DOES THE ENGIN
E SOUND?** ARE THERE ANY ODD NOI
SES? ()YES ()NO"
670 PRINT#-2,"ARE THERE ANY LEAK
S UNDER THE CAR? ()YES ()NO** IF
 YES,WHERE ARE THEY COMING    FR
OM?"
680 PRINT#-2,"DOES THE TRANSMISS
ION SHIFT SMOOTHLY? ()YES ()NO"
690 PRINT#-2,"DO THE BRAKES PULL
 TO ONE SIDE OR THE OTHER? ()YES
 ()NO"
700 PRINT#-2,"DOES THE STEERING
WORK OK? ()YES ()NO"
710 PRINT#-2,"HOW IS THE SUSPENS
ION?**DO THE SHOCKS AND SPRINGS
SEEM TO BE OK? ()YES ()NO"
720 PRINT#-2,"IS THERE A WARRANT
Y ON THE CAR? ()YES ()NO **IF YE
S HOW LONG AND WHAT IS COVEREDBY
 THIS WARRANTY?"
730 PRINT#-2,"IS THERE A REPAIR
RECORD FOR THIS CAR? ()YES ()NO"
740 PRINT#-2,"DO YOU KNOW OF ANY
THING THAT IS WRONG WITH THIS CA
R? ()YES ()NO**IF YES WHAT?"
750 NEXTPR
760 CLS:PRINT@236,"GOOD LUCK"
770 PRINT#-2:PRINT#-2:PRINT#-2:P
RINT#-2
```

See pg 9 for Version 3.2

VIP Writer III

VIP Writer has ALWAYS led the pack with features and now VIP Writer III still leads the way! The chart below illustrates this fact. Telewriter 128 only gives you 48K for text. Why is it called Telewriter 128? Word power 3 gives only 72K! VIP Writer III makes use of over 106K! VIP Writer III is the ONLY CoCo 3 word processor worthy of it's name!

WORD PROCESSOR COMPARISON CHART

CoCo3 with 128K	VIP Writer III	Telewriter 128	Word Power 3
Text Storage	OVER 49,000	48,000	72,000
Print Spooler	YES 57,000	NONE	NONE
Total Storage	**106,000**	48,000	72,000
Spelling Checker	VIP Speller	NONE	FREE WARE
RGB HD Support	100%	NONE	NONE
Screen Display	32/40/64/80	40/80	80

SCREEN DISPLAY OPTIONS

As the chart above shows - VIP Writer III offers more screen width options -all with 24 lines and actual lower case letters. It uses the CoCo 3's hardware display and double clock speed and is VERY VERY FAST! You can choose fore and background colors from up to 64 different hues. Color can be turned ON or OFF for the best possible display using a color or monochrome monitor or TV set. VIP Writer III has a built in on-line context sensitive help facility which displays command usage in easy to read colored windows.

CUSTOMIZER & PRINTER INSTALLER

VIP Writer III comes with a configuration / printer installation program which lets you customize VIP Writer III to suit your own liking. You can set screen width and colors as well as margins and more. You can also install your own printer and set interface type (serial, parallel or J&M), baud rate, line feeds, etc. Once done, you never have to enter these parameters again! VIP Writer III will load n' go with your custom configuration every time!

TEXT FILE STORAGE

VIP Writer III creates ASCII text files which are compatible with all other VIP Programs as well as other programs which use ASCII file format. You can use VIP Writer III to even create BASIC programs! There is a 49K text buffer and disk or cassette file linking allowing virtually unlimited text space. VIP Writer III works with up to four disk drives and lets you display disk directories and free space as well as rename or kill disk files. In addition VIP Writer III is 100% compatible with the RGB Computer Systems HARD DISK.

EDITING FEATURES

VIP Writer III has a full featured screen editor which can be used to edit text with lines up to 240 characters long with or without automatic word wrap around. You can select type-over mode or insert mode. There is even an OOPS command to recall a cleared text buffer. Other editing features include: Type-ahead • typamatic key repeat and key beep for flawless text entry • end of line bell • full four way cursor control with scrolling • top of textfile • bottom of textfile • page up • page down • top of screen • bottom of screen • beginning of line • end of line • left one word • right one word • DELETE character, to beginning or end of line, word to the left or right, or entire line • INSERT character or line • LOCATE and/or CHANGE or DELETE single or multiple occurrence using wildcards • BLOCK copy, move or delete with up to TEN simultaneous block manipulations • TAB key and programmable tab stops • word count • line restore • three PROGRAMMABLE FUNCTIONS to perform tasks such as auto column creation and multiple copy printing.

TEXT FORMATTING

VIP Writer III automatically formats your text for you or allows you to format your text in any way you wish. You can change the top, bottom, left or right margin and page length. You can set your text flush left, center or flush right. You can turn right hand justification on or off. You can have headers, footers, page numbers and TWO auxiliary lines which can appear on odd, even or all pages. You can also select the line on which they appear! You can even change the line spacing! Parameters can be altered ANYWHERE!

PREVIEW PRINT WINDOW

VIP Writer III features an exclusive format window which allows you to preview your document BEFORE PRINTING IT! You are able to move up, down, left and right to see centered text, margins, page breaks, orphan lines etc. This makes hyphenation a snap!

PRINTING

VIP Writer III prints TWICE as fast as any other CoCo word processor! It supports most serial or parallel printers using J&M JFD-CP or Rainbow interface and gives you the ability to select baud rates from 110 to 19,200. You can imbed printer control codes anywhere in your text file EVEN WITHIN JUSTIFIED TEXT! VIP Writer III also has TWENTY programmable printer macros which allow you to easily control all of your printers capabilities such as bold, underline, italics and superscript using simple key strokes. Other features include: multiple copy printing • single sheet pause • line feeds.

PRINT SPOOLING

Save up to $150 on a print spooler because VIP Writer III has a built in print spooler with a 57,000 character buffer which allows you to print one document WHILE you are editing another. You don't have to wait until your printer is done before starting another job!

DOCUMENTATION

VIP Writer III is supplied with a 125 page instruction manual which is well written and includes many examples. The manual has a tutorial and glossary of terms for the beginner as well as a complete index! VIP Writer III includes VIP Speller. DISK $79.95
Cassette version does not include VIP Speller. TAPE $59.95

VIP Writer owners: Upgrade to the VIP Writer III Disk for $49.95 or Tape for $39.95. Send original disk or tape. Include $3 S/H.

It's Word Processor Trade In Time

For a limited time you can trade in your old software for the VIP Writer I or III and save up to $20! Send in your old disk or tape and manual. VIP Writer tape $34.95, disk $49.95. VIP Writer III tape $44.95, disk $59.95. Include $3.00 shipping. Offer expires 8/31/88

VIP Database III

The VIP Database III features selectable screen displays of 40, 64 or 80 characters by 24 lines with choice of 64 foreground and background colors for maximum utility. It uses the CoCo 3's hardware screen and double clock speed to be the FASTEST database available! VIP Database III will handle as many records as will fit on your disks and is structured in a simple and easy to understand menu system with full prompting for easy operation. Your data is stored in records of your own design. All files are fully indexed for speed and efficiency. Full sort of records is provided for easy listing of names, figures, addresses,etc., in ascending or descending alphabetical or numeric order. Records can be searched for specific entries using multiple search criteria. With Database III mail-merge you may also combine files, sort and print mailing lists, print form letters, address envelopes - the list is endless. The built-in MATH package even performs arithmetic operations and updates other fields. VIP Database III also has a print spooler and report generator with unlimited print format capabilities including embeddable control codes for use with ALL printers. DISK $69.95

VIP Database owners: Upgrade to the VIP Database III Disk for $39.95. Send original disk. Include $3 shipping.

VIP Integrated Library

The VIP Integrated Library combines all six popular VIP application programs - VIP Writer*, Speller, Calc, Database*, Terminal and Disk-ZAP - into one program on one disk! The program is called VIP Desktop. From the desktop you have instant access to word processing with a spelling checker always in attendance, data management with mail merge, spreadsheet financial analysis, telecommunications and disk maintenance. 64K. required . Include $4.00 shipping for this product. DISK $149.95

*CoCo 3 owners: Purchase the VIP Integrated Library /WDE (Writer & Database Enhanced) which has the VIP Writer III and VIP Database III in place of the VIP Writer and VIP Database. Include $4.00 shipping for this product. *DISK $169.95*

Previous VIP Library owners: Call or write for upgrade pricing.

VIP Writer

VIP Writer is also available for CoCo 1 and 2 owners and has all the features found in the VIP Writer III including VIP Speller except for the following: The screen display is 32, 51, 64 or 85 columns by 21 or 24 rows. Screen colors are green, black or white. Help is not presented in colored windows. Double clock speed is not supported. Parallel printer interface is not supported. Print spooler is not available. Hard disk is not supported. Even so, VIP Writer still out-features the rest! It's a CoCo 1 or 2 owners best choice in word processors. Includes VIP Speller. DISK $69.95
Cassette version does not include VIP Speller. TAPE $49.95

VIP Speller

VIP Speller works with ANY ASCII file created by most popular word processors. It automatically checks text files for words to be corrected, marked for special attention or even added to the dictionary. You can even view the misspelled word in context! VIP Speller comes with a specially edited 50,000 word dictionary, and words can be added to or deleted from the dictionary or you can create your own. DISK $34.95

VIP Database

VIP Database has all the features of VIP Database III except the screen widths are 51, 64 and 85. Screen colors are green, black and white, double speed is not supported, spooler is not available. Still VIP Database is the best database for the CoCo 1 & 2! DISK $49.95

VIP Calc

Now every CoCo owner has access to a calculating and planning tool better than VisiCalc™, containing all its features and commands and then some. VIP Calc displays 32, 51, 64 or 85 characters by 21 or 24 lines right on the screen. VIP Calc allows up to a 33K worksheet with up to 512 columns by 1024 rows! In addition, VIP Calc has multiple windows which allow you to compare and contrast results of changes. Other features include 16 DIGIT PRECISION • trig. functions • averaging • algebraic functions • column and row ascending and descending SORTS • locate formulas or titles in cells • block move and replicate • global or local column width • limitless programmable functions • works with ANY printer. Embed printer control codes for customized printing. Combine spreadsheet data with VIP Writer documents to create ledgers, projections, statistical and financial budgets and reports. Requires 64K. DISK $59.95

VIP Terminal

For your important communications needs you've got to go beyond software that only lets you chat. You need a smart terminal so that you can send and receive programs and messages and print them! The VIP Terminal features 32, 51, 64 or 85 characters by 21 or 24 lines on the screen and has a 43K byte buffer to store information. DISK $39.95

VIP Disk-ZAP

VIP Disk-ZAP is the ultimate disk repair utility for simple and quick repair of most disk errors. Designed with the non-programmer in mind, the VIP Disk-ZAP will let you retrieve all types of bashed files, BASIC and Machine Language programs. It even works with 40 track drives! The 50 page tutorial makes the novice an expert. DISK $24.95

All disk products are unprotected and run under RSDOS.

SD ENTERPRISES

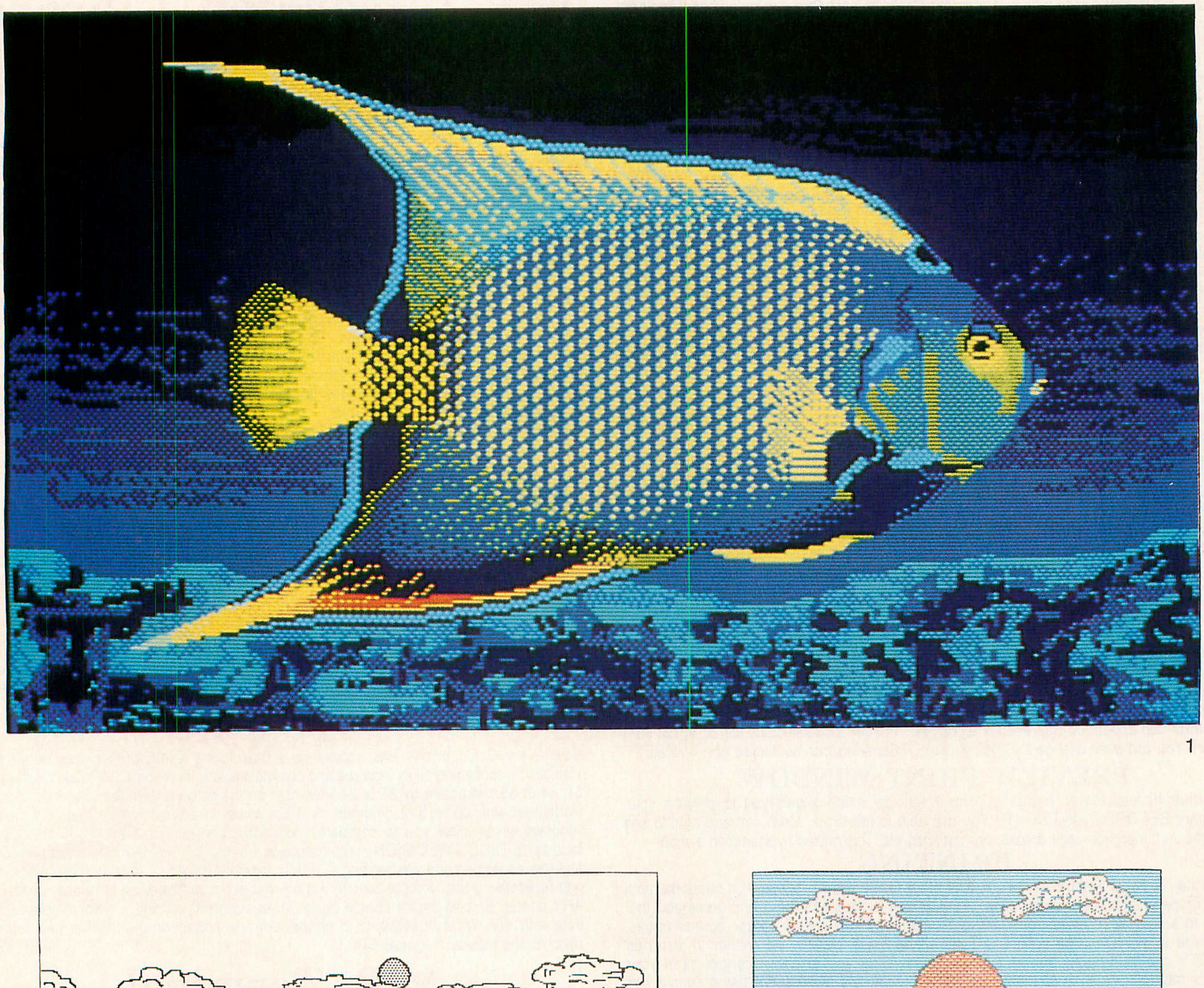
☎(503) 663-2865 ✉POB 1233 Gresham, OR 97030

Please add $3 for shipping and handling. Outside continental US add $4 S/H. COD orders add an additional $2.25. Checks allow 3 weeks for delivery. All other orders are shipped the same day.

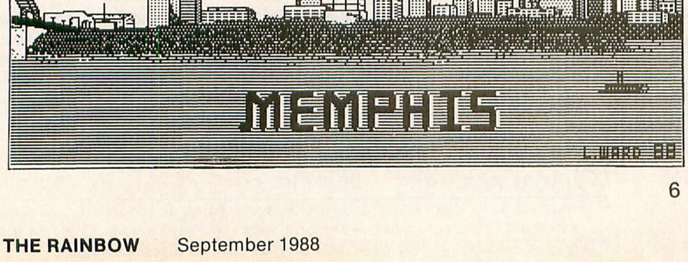
Telewriter 128 is a trademark of Cognitec. Word Power 3 is a trademark of Microcom Software.

The CoCo Gallery

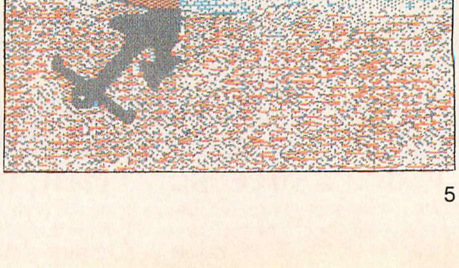
Live at Rainbowfest Chicago May 20-22, 1988



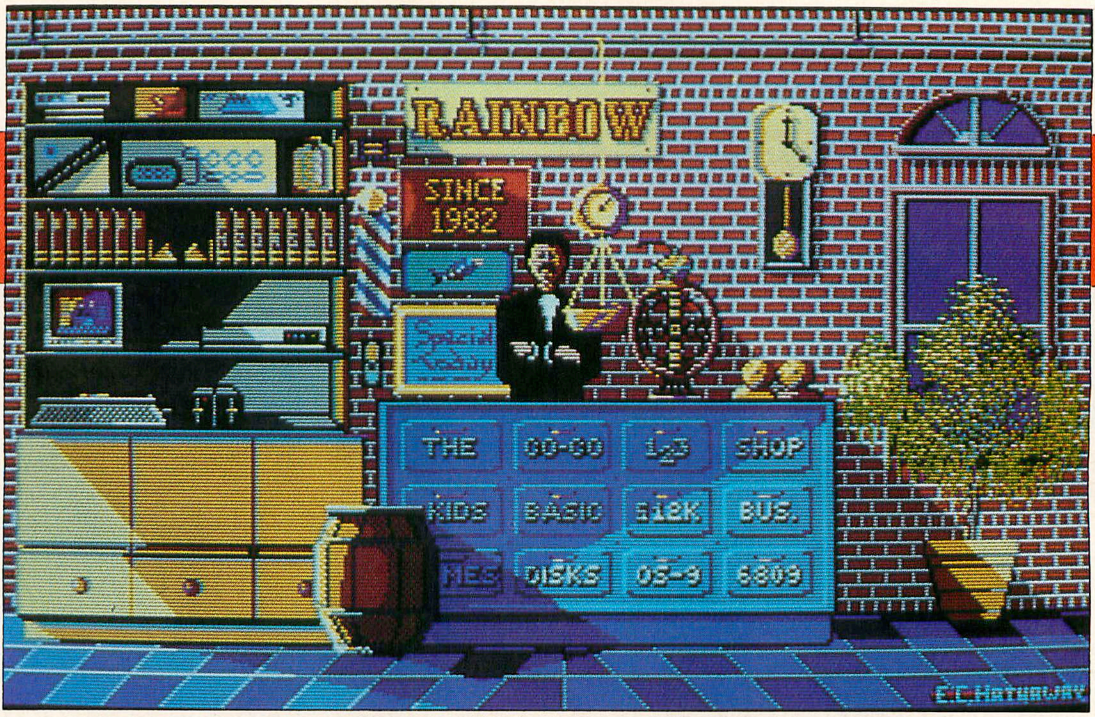
1


MEMPHIS
L.WARD 88

6



5



2

(1) **1st Place (CoCo 3)**

Queen Angelfish by Hal Katschke

Hal, of Frankfort, Illinois, used *Color Max 3* to create this brightly colored tropical fish. He enjoys developing graphics and programming in BASIC and assembly language.

(2) **2nd Place (CoCo 3)**

CoCo 3 Shop by Ed Hathaway

Color Max Deluxe was used to develop Ed's depiction of what a RAINBOW store in Prospect, Kentucky, would look like. Ed is in partnership with Second City Software and is president of the Glenside Color Computer Club of Illinois.

(3) **3rd Place (CoCo 3) Tie!**

Sunset by Tracy Lammardo

Tracy, of Clifton Park, New York, used *Color Max Deluxe* to create this atmospheric phenomenon. She is a graphic designer and uses computer graphics and desktop publishing in her work.

(4) **3rd Place (CoCo 3) Tie!**

Maine by Ed Hathaway

Ed used *Color Max Deluxe* to create his rendition of the famous Portland Head Light lighthouse in Portland, Maine, as a reminder of his New England home. Ed now lives in Glendale Heights, Illinois, with his wife, Ruth, and 3-year-old son, Scott.

(5) **1st Place (CoCo 1 & 2)**

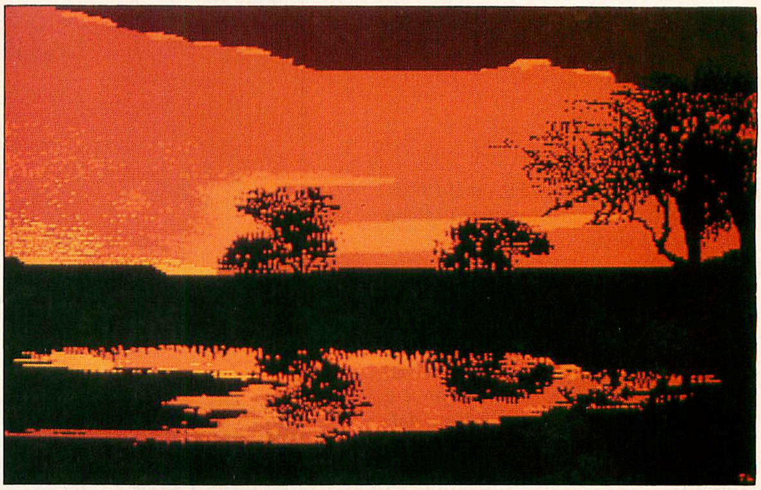
Sea Set by Randy Adams

CoCo Max II was used to create this graphic. Randy is the head shipping clerk at The Computer Center and is a member of the Memphis Color Computer Club Users Group.

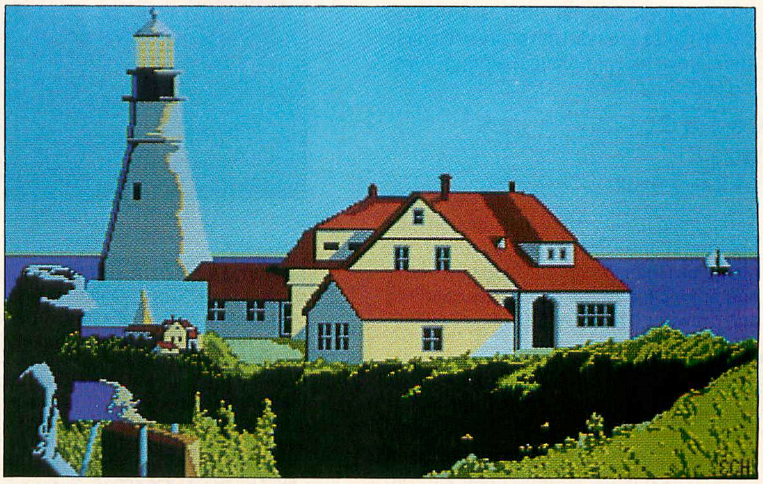
(6) **1st Place (Black & White)**

Memphis by Logan Ward

Logan used *Color Max 3* to illustrate his city's skyline. His interests include baseball card collecting and following NASCAR races.



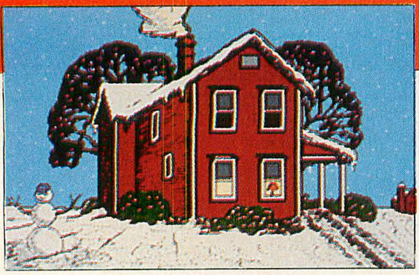
3



4

Honorable Mention

For details on the next CoCo Gallery Live competition, see Page 49.



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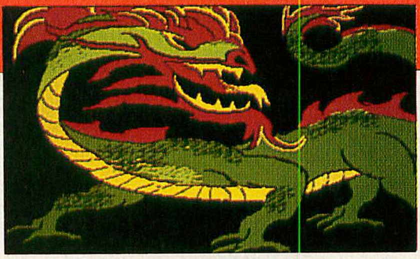

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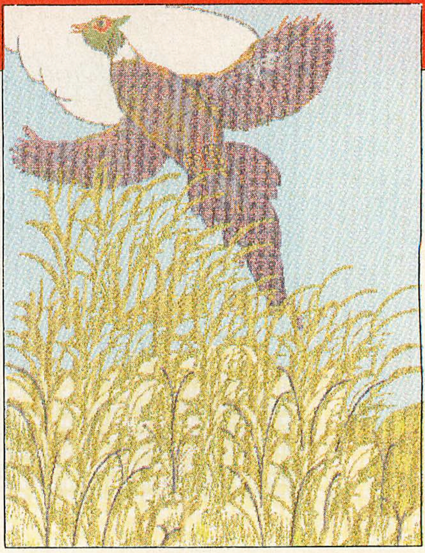

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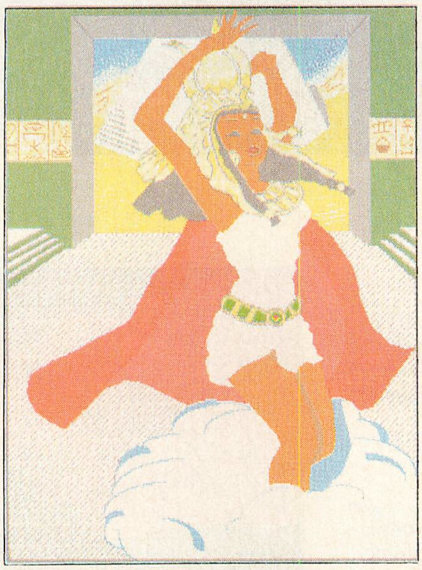

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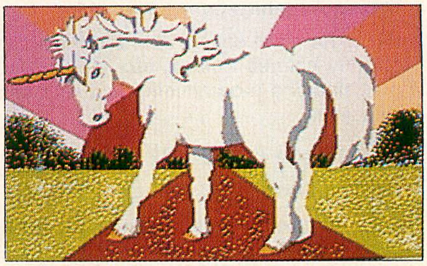

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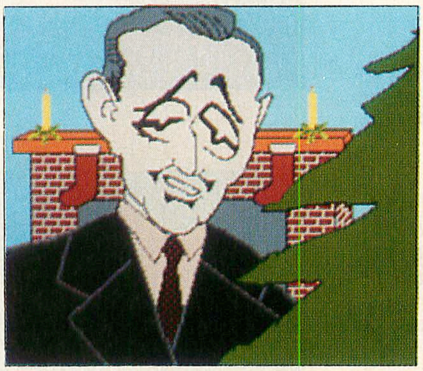
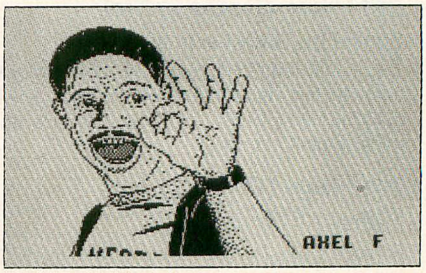


12



13

CoCo 3

(7) **Winter Home**
by Logan Ward

Color Max 3 was used to draw this scene. Logan is the president of the Memphis Color Computer Club Users Group, and is the artist behind THE RAINBOW's CoCo Cat and Maxwell Mouse cartoons. He and his wife, Stacey, live in Memphis, Tennessee.

(8) **Fire-Breathing Dragon**
by Howard C. Rouse

(9) **Pheasant in Flight**
by Howard C. Rouse

Howard used *CoCo Max III* to create these two graphics. He is a 63-year-old retiree from Ocala, Florida.

(10) **Egyptian Dancer**
by Madeleine Dufour

CoCo Max III was used to design this graphic. Madeleine, of Cacouna, Quebec, is the mother of three grown children and uses the CoCo for word processing, databasing, playing Adventures and drawing.

(11) **Unicorn**
by Christine Dufour

Christine used *CoCo Max III* to illustrate this mythical animal. She is studying mathematics at Laval University in Canada and enjoys playing piano, painting, reading and computing.

CoCo 1 & 2

(12) **Bing**
by Terry Peck

Terry used *CoCo Max II* to design this holiday scene. She is the editor of the Memphis Color Computer Club newsletter and enjoys fun in the sun, cross-stitching and drawing on her CoCo.

Black & White

(13) **Axel Foley**
by Brian Gillaume

Brian, of Green Bay, Wisconsin, used *CoCo Max II* to depict this character from the first of the *Beverly Hills Cop* movies.

SHOWCASE YOUR BEST! You are invited to nominate original work for inclusion in upcoming showings of "CoCo Gallery." Share your creations with the CoCo Community! Be sure to send a cover letter with your name, address and phone number, detailing how you created your picture (what programs you used, etc.) and how to display it. Also, please include a few facts about yourself.

Don't send us anything owned by someone else; this means no game screens, digitized images from TV programs or material that's already been submitted elsewhere. A digitized copy of a picture that appears in a book or magazine is *not* an original work.

We will award two first prizes of $25, one for the CoCo 3 and one for the CoCo 1 and 2; one second prize of $15 and one third prize of $10. Honorable Mentions may also be given.

Please send your entry on either tape or disk to the CoCo Gallery, THE RAINBOW, P.O. Box 385, Prospect, KY 40059. Remember, this is a contest and your entry will not be returned.

— Angela Kapfhammer, Curator

Telewriter-128™

the Color Computer 3 Word Processor

For over 5 years now, Telewriter has been the #1 Color Computer word processor, both in popularity and in performance. Telewriter's near perfect mix of sophisticated professional features and a very natural user interface, has earned it the highest praise in numerous magazines, and an intensely loyal following among tens of thousands of Color Computer users all over the world.

HISTORY

Throughout the history of the Color Computer, Telewriter has pioneered software breakthroughs that set the standards.

In 1981, it was Telewriter 1.0 that first took the Color Computer's inadequate 32X16 all-uppercase display, and replaced it with a graphics-based 51X24 upper and lowercase display.

A few years later, Telewriter-64 added high density 64X24 and 85X24 displays and access to the full 64K of the newer Color Computers.

THE NEW AGE

Today, Telewriter-64 is recognized as the standard Color Computer word processor. It runs on all Tandy Color Computers — from the original Color Computer 1, to the Color Computer 2, and 3.

But the Color Computer 3 brings a whole new level of power to low cost computing and, so, a new Telewriter is here to put that power to work for you. We call it Telewriter-128.

TELEWRITER-128

You don't mess with a good thing, so Telewriter-128 is still Telewriter-64 at heart. The commands, and the user interface are essentially the same. If you know Telewriter-64, then you already know Telewriter-128. And, if you don't know Telewriter-64, you'll still have an easy time learning and using Telewriter-128.

80 COLUMNS

But there are major differences as well. First, Telewriter-128 uses the Color Computer 3's new 80 column screen display.

This means, simply, that using Telewriter-128 on a low cost Color Computer 3 will look a lot like using a more expensive word processor on a much more expensive IBM PC, PS/2, or clone.

SPEED

Second, Telewriter-128 is lightning fast. Telewriter-64 was fast in its own right, but, by accessing the Color Computer 3's video hardware directly, and by running the machine in double speed mode, Telewriter-128 is able to provide extremely fast scrolling and instant paging — functions whose speed is crucial to serious word processing.

In this department, Telewriter-128 doesn't simply keep up with IBM-based word processors — it generally surpasses them!

EASE

Third, Telewriter-128 adds a host of new features big and small, that make it even easier to use.

Features like: Quick function key access to the editor or the menus — an instant on-line help screen summarizing all Telewriter commands and special characters — an option file where you store your personal set of format and screen settings so you only have to set them once!

Then, there's a quick save feature which allows you to save all your current work without leaving the editor. There's a simple way to cursor through the disk directory and read in a file by just hitting ENTER. And there's more.

NEW POWER

Telewriter-64 always had the power to handle any kind of serious writing, from letters to textbooks. But, here too, Telewriter-128 adds major features.

Like Macros — which let you insert whole words or phrases (even sets of control codes or format commands) into your text, with a single keypress. And every time you power up Telewriter-128, the macro definitions are automatically loaded*, so they're always there.

Then there's a Print Preview feature that shows you, on-screen, the way your printed text will look — with margins, headers, centering, justification, page numbering, and page breaks. This guarantees letter perfect documents every time, and makes tasks like widow/orphan line elimination, a breeze.

TELEWRITER-64 OR TELEWRITER-128

We could go on listing features, but the point is this: If you own a Color Computer, you already have the hardware for the most powerful, low cost word processor in town. All you need now is to add the heart and soul:

Telewriter-64, for the Color Computer 1 and 2, costs $59.95 on disk, $49.95 on cassette.

Telewriter-128 for the Color Computer 3 costs $79.95 on disk, $69.95 on cassette.

To order by Mastercard or Visa call (619) 755-1258 anytime, or send check or money order plus $2 shipping (Californians add 6% sales tax) to:

COGNITEC
704 Nob Ave.
Del Mar, CA 92014

To upgrade from Telewriter-64 to Telewriter-128, return your original disk or cassette with $39.95. (Add $10 if you're also upgrading from cassette to disk. Deduct $10 with proof of Oct '87 - Feb '88, purchase of Telewriter-64.)

> *When I first got Telewriter-64 last year, I was in heaven. I couldn't believe the program's versatility and ease of use.*
> -The RAINBOW, Oct. 1985

TELEWRITER-64 FEATURES: Compatibility with any printer that works with the Color Computer; embedded control codes for underlining, boldface, sub/superscript, variable fonts; format commands for headers, centering, margin and spacing changes anywhere in the document; Format menu to set margins, spacing, page numbering, BAUD rate, lines per page, justification; Chain printing for one shot printing of multi-file documents. Fast, full-screen editor with wordwrap, block copy/move/delete, global search and replace, wild card search, fast 4-way auto-repeat cursor, fast scrolling, forward and backward paging, text alignment, tabs, error protection, word and line counter. Insert or delete text anywhere on the screen. Simple, easy to remember commands. Optional ASCII files for compatibility with spell checkers, terminal programs, and BASIC. Load, save, append, partial save files to disk or cassette. Kill, rename and list disk files. Cassette verify and auto-retry on error.

TELEWRITER-128 - ADDITIONAL FEATURES: Print preview from editor; multiple copy print; footers; hanging indents; cursor thru disk directory to load, append, rename and kill files; quick file save from editor; keyclick; key repeat; true block move; 24, 25, or 28 line screen; 40 or 80 column screen; dual speed cursor; on-line help; overstrike mode; word delete; wordwrap at margin; user definable macros; nested macros; instant status window for information on cursor position, word count, etc.; instant function key access to menus or editor; options menu for setting character and screen colors, key repeat and delay rates, definable foreign symbols.

IBM and PS/2 are trademarks of International Business Machines Inc. *disk version only

Cut down on time spent in formatting disks

Mass Disk Formatter

By Neal Larson

I use a double-sided drive and buy large quantities of disks. If you are like me, you know how monotonous formatting lots of disks can be! I decided to modify parts of the DSKINI routine in Disk-BASIC.

The code is broken into three simple but effective routines. The first section is simply a routine to put your CoCo into all-RAM mode. The second routine prints a message to tell you when to put in a new disk. The final routine changes the drive number and inserts a jump into the DSKINI routine to return it to this program. The program allows the user to set up the number of drives and formatting order, then writes a stand-alone binary program that can be loaded and used separately.

The number of actual in-program messages is limited because of size limitations of the cassette buffer where the program resides. This was the easiest place to put the program since it isn't used by the DSKINI routine by 16K or 64K CoCos.

I have found this program works best with a straight drive system or with the hardware switch (DOS tricker) that allows the use of both sides. I use the hardware switch to make my Drive 0 into drives 0 and 2 and my second drive as drives 1 and 3. When I have the program set to 0, 2, 1, 3, it will format 0 and 2 then go to the next drive for 1 and 3. Then it pauses until I press a key — definitely better than typing DSKINI over and over and over!

To use the program, simply load and run it. There are intensive instructions and warnings to be sure to cold start your CoCo, because it does alter the memory, interferes with the normal use of DSKINI, and can cause the loss of data if a program uses the cassette buffer.

The first instruction asks you to enter the first drive you want to format. Then it asks if this is the last drive; if you want to use only the first drive or you have only one drive, answer Y for yes. The program now saves the binary program (in my case 0, 2, 1, 3).

Enter the numbers one at a time, because the BASIC program will step through the questions four times until you press Y, in which case it jumps to the save routine for the binary program.

This program has reduced the amount of time I spend on formatting disks to one-tenth of the time needed when using DSKINI. It is very simple and easy to use, due in part to the help I received from Ken Learman, who made the program even easier for the novice to use and to follow.

(Questions or comments regarding this utility may be directed to the author at 743½ W. College Avenue, #8, Appleton, WI 54911. Please enclose an SASE when requesting a reply.) ☐

Neal Larson owns a home-based software business, Dualtronics Software, and holds a Ph.D. in computer science and in computer programming.

180 91
300 221
490 50
600 101
END 60

The listing: FORMATTR

```
10 '****************************
20 '*    MASS DISK FORMATTER   *
30 '*            BY            *
40 '*       NEAL LARSON        *
50 '*      (C)1988 BY          *
60 '*   DUALTRONICS SOFTWARE   *
70 '*    APPLETON WISCONSIN    *
80 '* PUBLIC DOMAIN SOFTWARE   *
90 '****************************
100 CLS
110 GOSUB 550
120 PRINT@32,CHR$(128);"super";C
HR$(128);"disk";CHR$(128);"forma
tting";CHR$(128);"routine";CHR$(
128);CHR$(128);
130 PRINT@224,STRING$(9,128);"pr
ess";CHR$(128);"a";CHR$(128);"ke
y";STRING$(12,128);
140 EXEC 44539
150 CLS
160 PRINT@32,"THIS PROGRAM WILL
MAKE THE       NESSARY CHANGES TO
 THE RS DOS    IN ORDER TO MASS F
ORMAT (DSKINI)DISKS THE WAY THIS
 IS DONE       INVOLVES PUTTING T
HE COCO INTO   ALL RAM AND MAKING
 CHANGES TO    THE FORMATTING ROU
```

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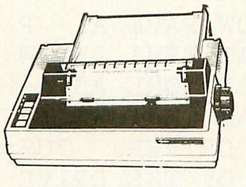

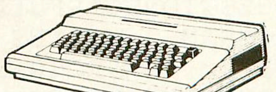

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```
TINE SO WHEN "
170 PRINT"YOU ARE DONE FORMATTIN
G BE SURE TO COLD START YOUR COC
O (TURN ITOFF THEN BACK ON AGAIN
) JUST A  RESET MAY NOT ALLWAYS
REBOOT THE ROMS"
180 PRINT:PRINT"PRESS A KEY TO C
ONTINUE":EXEC 44539:CLS
190 PRINT"PLEASE READ ALL OF THE
 QUESTIONSCARFULLY BECAUSE THIS
PROGRAM   WRITES A MACHINE LANGU
AGE       PROGRAM THAT IS STAND
ALONE AND NEEDS NO OTHER PROGRAM
 TO WORK"
200 PRINT:PRINT"PRESS A KEY TO C
ONTINUE"
210 EXEC 44539
220 CLS
230 PRINT@32,"FIRST, THE NEXT SE
T OF QUESTIONSWILL MAKE THE NESS
ARY          ADJUSTMENTS TO THE
 PROGRAM FOR  YOUR NEEDS!"
240 PRINT@224,"PRESS A KEY TO CO
NTINUE!"
250 EXEC 44539
260 PRINT@32,"SET ORDER OF DRIVE
S FOR FORMAT"
270 DR$="FIRST"
280 FOR NU=1 TO 4
290 CLS:PRINT@96,"WHAT DRIVE DO
YOU WANT ";DR$:INPUT DR
300 IF DR$="FOURTH" THEN 410
310 GOSUB 350
320 PRINT@160,"IS THIS THE LAST
DRIVE?          [Y] OR [N] ";:LIN
EINPUT QU$
330 IF QU$="Y" THEN 430
340 NEXT NU
350 IF NU=1 THEN DR$="SECOND":GO
TO 380
360 IF NU=2 THEN DR$="THIRD":GOT
O 380
370 IF NU=3 THEN DR$="FOURTH"
380 IF NU=1 THEN POKE&H255,DR:GO
TO 420
390 IF NU=2 THEN POKE&H264,DR:GO
TO 420
400 IF NU=3 THEN POKE&H273,DR:GO
TO 420
410 POKE&H282,DR:GOTO 490
420 RETURN
430 IF NU=1 THEN POKE&H24F,&H01:
POKE&H250,&HF2:GOTO 460
440 IF NU=2 THEN POKE&H25E,&H01:
POKE&H25F,&HF2:GOTO 460
450 IF NU=3 THEN POKE&H26D,&H01:
POKE&H26E,&HF2:GOTO 460
460 IF PEEK(&H250)=&HF2 THEN SAV
EM"FORMAT",&H1DA,&H25C,&H1DA:GOT
O 500
470 IF PEEK(&H25F)=&HF2 THEN SAV
EM"FORMAT",&H1DA,&H26B,&H1DA:GOT
O 500
480 IF PEEK(&H26E)=&HF2 THEN SAV
EM"FORMAT",&H1DA,&H27A,&H1DA:GOT
O 500
490 IF PEEK(&H27D)=&HF2 THEN SAV
EM"FORMAT",&H1DA,&H289,&H1DA
500 CLS
510 PRINT@32,"YOU NOW HAVE A   P
ROGRAM LABELED[FORMAT.BIN] AND W
HEN YOU USE ITIT WILL WORK AS A
STAND ALONE   PROGRAM THAT WILL
NOT NEED A    BASIC DRIVER.  JUS
T REMEMBER THEORDER OF THE DRIVE
S YOU USED    WHEN YOU USE THE P
ROGRAM!"
520 PRINT"remember THIS PROGRAM
AND         [FORMAT.BIN] REALLY ME
SSES WITH THE MEMORY AND YOU SHO
ULD COLD  START YOUR COMPUTER BE
FORE YOU  USE ANY OTHER PROGRAM!
"
530 EXEC 44539
540 END
550 CLS
560 PRINT@226,"STAND BY SETTING
UP PROGRAM."
570 FOR P=474 TO 651
580 READ A
590 POKE P,A
600 NEXT P
610 CLS0
620 RETURN
630 DATA 26,80,142,128,,166,132,
183,255,223,167
640 DATA 128,140,224,,39,5,183,2
55,222,32,239,28,175,189,169,40
650 DATA 142,4,32,16,142,2,32,14
1,23,142,4,96,16,142,2,48
660 DATA 141,14,189,173,251,142,
4,224,16,142,2,67,141,2,141,57
670 DATA 166,160,129,,39,4,167,1
28,32,246,57,73,78,83,69,82
680 DATA 84,96,78,69,87,96,68,73
,83,75,,82,69,65,68,89
690 DATA 122,96,80,82,69,83,83,9
6,65,96,75,69,89,,70,79
700 DATA 82,77,65,84,84,73,78,71
,,142,2,93,191,210,208,150
710 DATA ,151,235,198,4,189,213,
178,142,2,108
720 DATA 191,210,208,134,1,151,2
35,198,4,189,213,178,142,2,123,1
91
730 DATA 210,208,134,2,151,235,1
98,4,189,213,178,142,1,242,191,2
10
740 DATA 208,134,3,151,235,198,4
,189,213,178,18,255
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CoCoMAX II: By Colorware
The 'CLASSIC' CoCo graphic program. Draw great works of art with the program that set a standard for all others to follow. Supported by a Hi-Res interface and numerous printer drivers for complete configuration.
64k DISK.....................$78.45

CoCoMAX III: By Colorware
All new program based off the 'CLASSIC' CoCoMax II software. Allows for full animation, select 16 colors from a 64 color palette, fast & easy to use w/ pull down menus in a point-and-click environment.
128k or 512k DISK.............$78.45

CoCo KEYBOARD:
Program allows the user to utilize the function keys on the HJL-57 Professional, Deluxe CoCo, and Micronix keyboard. 32k DISK.............$6.95

TELEPATCH:
Turn Telewriter 64 into the best Word Processor for the CoCo 1&2! TELEPATCH is compatible with all CoCo's. Comes with complete documentations for easy upgrading and changes.
64k DISK.....................$24.95

HI-RES FONT MODIFIER:
Create, modify, save and re-use as many CoCo 3 fonts that you can imagine.
128k DISK....................$14.95

COLOR MAX III FONT EDITOR:
Allows you to custom create your own special ColorMax III fonts. Program and manual is easy to use for outstanding results! 128k DISK....$19.95

SCHEMATIC DRAFTING PROCESSOR:
A 'FAST' and 'EASY TO USE' ELECTRONIC DRAFTING PROCESSOR. Create pro-looking diagrams using a 480x540 pixel screen with 6 viewing windows! Over '30' electronic symbols with 10 definable symbols. Even supports Logic gates & Multipin chips! Print hardcopy or save to disk for later use.
64k DISK.....................$22.95

OS-9 SOLUTION:
Tame the hostile environment of OS-9 with OS-9 SOLUTION! Replaces 20 of the command calls with single key- stroke, menu driven commands. No more long and complex pathnames or syntaxes to remember! Works with either OS-9 Level One or Two....................$24.95

TAPE/DISK UTILITY:
A utility package that transfers TAPE to DISK or DISK to TAPE automatically. If you just got your first disk drive, TAPE/DISK is a MUST HAVE program. Will print tape & disk directories to any supported printer.
64k DISK.....................$19.95

FAST DUPE 2:
Backup & Format as many copies of your original disk that you need. FAST DUPE 2 reads source into memory for fast and realible disk transfer. Supports up to 4 disk drives
64k DISK.....................$19.95

MY DOS: By Chris Hawks
Supports accesses to double sided drives, able to use the J&M Controller with the CoCo 3, DIR commands simplified and a host of other special features. 64k DISK............$14.95

VIP LIBRARY:
This popular 'intergraded' package includes, VIP Writer, Terminal, Data Base, Calc and Disk Zap which can fix a diskette with I/O errors. SCS special price. 64k DISK..............$125.00

SOFTWARE SPOOLER & RAM DISK:
Quick response or no disk swapping drive backups for 1 drive system. Printer spooler to free computer during printing. 512k DISK........$19.95

THE NEWSPAPER:
Use your CoCo 3 for 'DESK TOP PUBLISHING!' THE NEWSPAPER is a complete & sophisticated program for creating Banners, Headlines & Text columns. Allows for importing different pictures, fonts & full patterns from disk for that professional look! Includes 22 fonts and 50 pictures. This one-of-a-kind program has over 140k of program code! 128k or 512k DISK.........$39.95

THE NEWSPAPER GRAPHICS DISK I:
The FIRST OFFICIAL supplementary program disk for THE NEWSPAPER. Contains '50' NEW PICTURE FILES, '10' NEW FILL PATTERNS and '3' ADDITIONAL FONT SETS! GRAPHICS DISK I is available only from Second City Software at a special introductory price of...........$16.95

COMING SOON, THE NEWSPAPER PLUS!
If you bought THE NEWSPAPER from SCS then the updated program disk will be FREE! If you bought this program from someone else, there will be an upgrade fee of $19.95.

NEW SCS SOFTWARE PROGRAMS

A-DOS 3: The very popular Disk Operating System from SpectroSystems for the CoCo 3........................$34.95
SCS can custom 'burn' your ADOS 3 program onto an EPROM. Call or write for full details.

TELEWRITER-128: Take your CoCo 3 to new word processing heights with this ALL NEW and IMPROVED program. Stop playing around with upgrades and patches to TW-64! 128k or 512k DISK..........$76.95

SECOND CITY SOFTWARE

ACCEPTS MASTER CARD, VISA, C.O.D. AND CHECK ORDERS. PLEASE ADD $2.50 FOR SHIPPING & ALLOW 1 TO 3 WEEKS FOR DELIVERY. C.O.D. ORDERS, ADD AN ADDITIONAL $2.00.

Fantasy joins forces with CoCo to help children's reading skills

The Big Bad Wolf

By Rick Cooper

Using a CoCo 3, *Badwolf* helps young children learn their ABCs. In this program, a favorite fairy tale is used to teach children both the alphabet and keyboard skills.

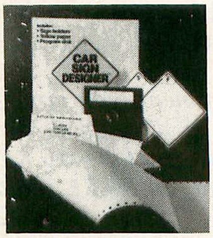
The program opens with a scene from the fairy tale, "The Three Little Pigs." The child is asked to help the smart pig along the path to its home by typing in the letters of the alphabet. For every correct answer, the little pig takes

---

Rick Cooper, a principal, teacher and coach, enjoys writing programs more than using them. Although many of Rick's programs are used by his teachers and students, his best critics are his wife, Donna, and daughters, Kristin and Kasey.

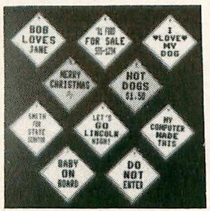
CAR SIGN DESIGNER™

Make Your Own Professional Looking Custom Car Signs



Complete Car Sign Designer

Program Editing Screen



Sample Car Signs

The Car Sign Designer™ includes everything you need:

- 2 plastic sign holders with suction cups
- 50 sheets of bright yellow 9 1/2" x 11" fanfold paper
- Car Sign Designer program on disk
- Clearly written users manual.

The Editor Screen:

- Lets you select 1,2,3, or 4 lines of text.
- Centers each line of text automatically.
- Adjusts character width on each line automatically.
- Uses special car-sign bold, easy to see, type face.
- Features WYSIWYG (What you see is what you get). All editing is performed on a full screen graphic representation of the actual sign that you are designing.
- Character set includes letters A to Z, digits 0 to 9, special symbols, and punctuations.

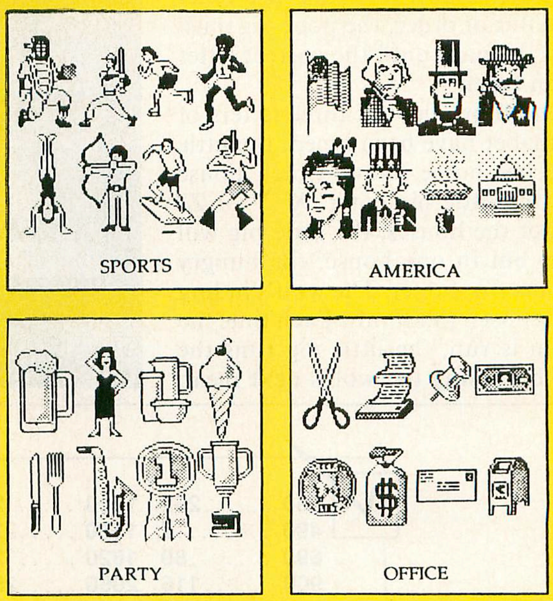
Make Signs In 4 Easy Steps:

1. **Design** the sign on the computer screen.
2. **Print** the sign on your dot-matrix printer.*
3. **Fold** the sign on the indicated lines.
4. **Insert** the sign into a reusable sign holder.

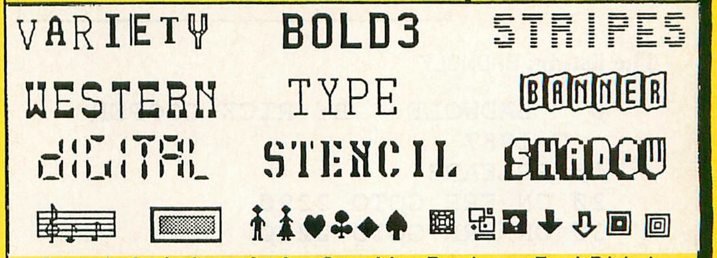
Hundreds Of Uses:

Express Yourself: Tell someone you love them, support your favorite sports team or political candidate, and more.
Change your message as often as you like: With the Car Sign Designer's reusable plastic holders it costs just a few pennies to make a new sign.
Use Them Everywhere: Put them in your car windows, recreational vehicles, on your refrigerator, room doors. Use them in stores and store windows for advertising.
Special Occasions: Make signs and use them, or even sell them, at special events such as church fundraisers, high-school football games, political rallies, automobile shows and races.

Requires 64K CoCo I,II,or III, same printers as CoCo Graphics Designer. Order #CSCC $29.95



Some Pictures from CoCo Graphics Designer Picture Disk #2



Sample fonts from CoCo Graphics Designer Font Disk A

GARAGE SALE
SAT & SUN APRIL 12-13
34 HILLTOP LANE GREENLAWN
COMPUTER FAIR JULY 24
GET YOUR TICKETS TODAY!
DANGER
DO NOT ENTER
HAPPY
MOON UNIT
THIN MUFFIN
LET'S GO SAILING

It's fun making your own Greeting Cards, Signs, and Banners.

Coco Graphics Designer

Only $29.95

The Coco Graphics Designer produces beautiful Greeting Cards, Banners, and Signs for holidays, birthdays and other occasions.

The program features picture, border, and character font editors, so that you can modify or expand the already built in libraries. Plus a special "grabber" utility is included to capture areas of high resolution screens for your picture library.

Requirements: a Coco I, II or III with at least 32K, one disk drive, BASIC 1.0/1.1, ADOS 1.0/1.1 or JDOS. Printers supported include: Epson RX/FX, Gemini 10X, SG10, NX10, DMP 100/105/110/130/430 CGP220, many Okidata (check with Zebra), Seikosha GP100/250, Gorilla Banana, Legend 808. **Order #C323 Coco Graphics Designer**

Picture Disk #1

This supplementary picture library diskette contains over one hundred additional pictures.

#C333 Picture Disk #1 $14.95

Colored Paper Packs

150 sheets (50 each red, yellow, blue) with 60 matching envelopes. Perfect for making your productions outstanding.

#C274 Paper Pack $19.95

Three New Picture Disks

We've hired freelance professional artists to expand the selection of pictures, and fonts available for our Coco Graphics Designer. We think you'll agree that the quaility of their work is excellent. Each picture disk contains 128 pictures.

The selection of pictures has been guided by the requests we've received from our many Coco Grahics Designer customers. If we've missed drawing pictures for subjects that interest you, please submit your requests for our consideration.

Picture Disk #2 $14.95

Special Occasions: Party Hat, Cake, Gift Box, Champaigne, Juke Box, Saxaphone, etc.
Sports: Baseball, Basketball, Tennis, Running, etc.
Office: Computer, File Cabinet, Memo Pad, Clip Board, etc,
American: Flag, Eagle, Astronaut, Indian, Liberty Bell, etc.

Picture Disk #3 $14.95

Religion: Church, Cross, Candles, Menorah, Bible, Star, etc.
Animals: Dogs, Cats, Tiger, Cow, Giraffe, Birds, Elephant, Turtle, Pig, Horse, etc.
Nature: Flowers, Trees, Sunsets, Mountains, Lakes, etc.
Travel: Car, Bus, Airplane, Taxi, Gas Pump, Tickets, etc.

Picture Disk #4 $14.95

Includes these holidays and others...

Christmas: Tree, Star, Wreath, etc.
Easter: Egg, Bunny, Lillies, etc.
New Years: Calendar, Fireworks
Chanukah: Menorah, Star, etc.
Holloween: Pumpkin, Witch, etc.
Independence Day: Liberty Bell, Independence Hall, Fireworks, etc.
Presidents Day: Linclon, Washington, etc
Ground Hog Day: Ground Hog, Etc.

Two New Font Disks

Font Disk A $14.95
Contains 10 Fonts
Font Disk B $14.95
Contains 10 Fonts

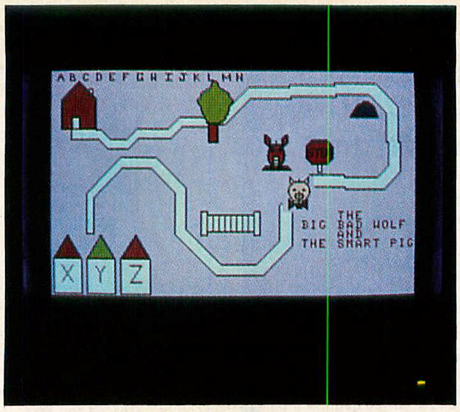
NOTE: Our WICO Trackballs and Coco Car Sign Designer are still available. See our ad in the previous issue of Rainbow.

Ordering Instructions: All orders add $3.00 Shipping & Handling. UPS COD add $3.00. VISA/MC Accepted. NY residents add sales tax.

Zebra Systems, Inc.
78-06 Jamaica Ave.
Woodhaven, NY 11421
(718) 296-2385

another step closer to home. If a letter is typed out of order, the poor pig must wait on the path until the correct letter has been typed.

When all but the last three letters of the alphabet have been typed, the little pig reaches home. Now, which house should the little pig enter, X, Y or Z? In two of the houses, the little pig will be safe; but in one house, the hungry wolf waits for dinner. The wolf's hiding place is chosen randomly. Each time the program is run, the little pig runs the risk of becoming the wolf's next meal.



The child must choose a house and hope that the little pig doesn't have a run of bad luck.

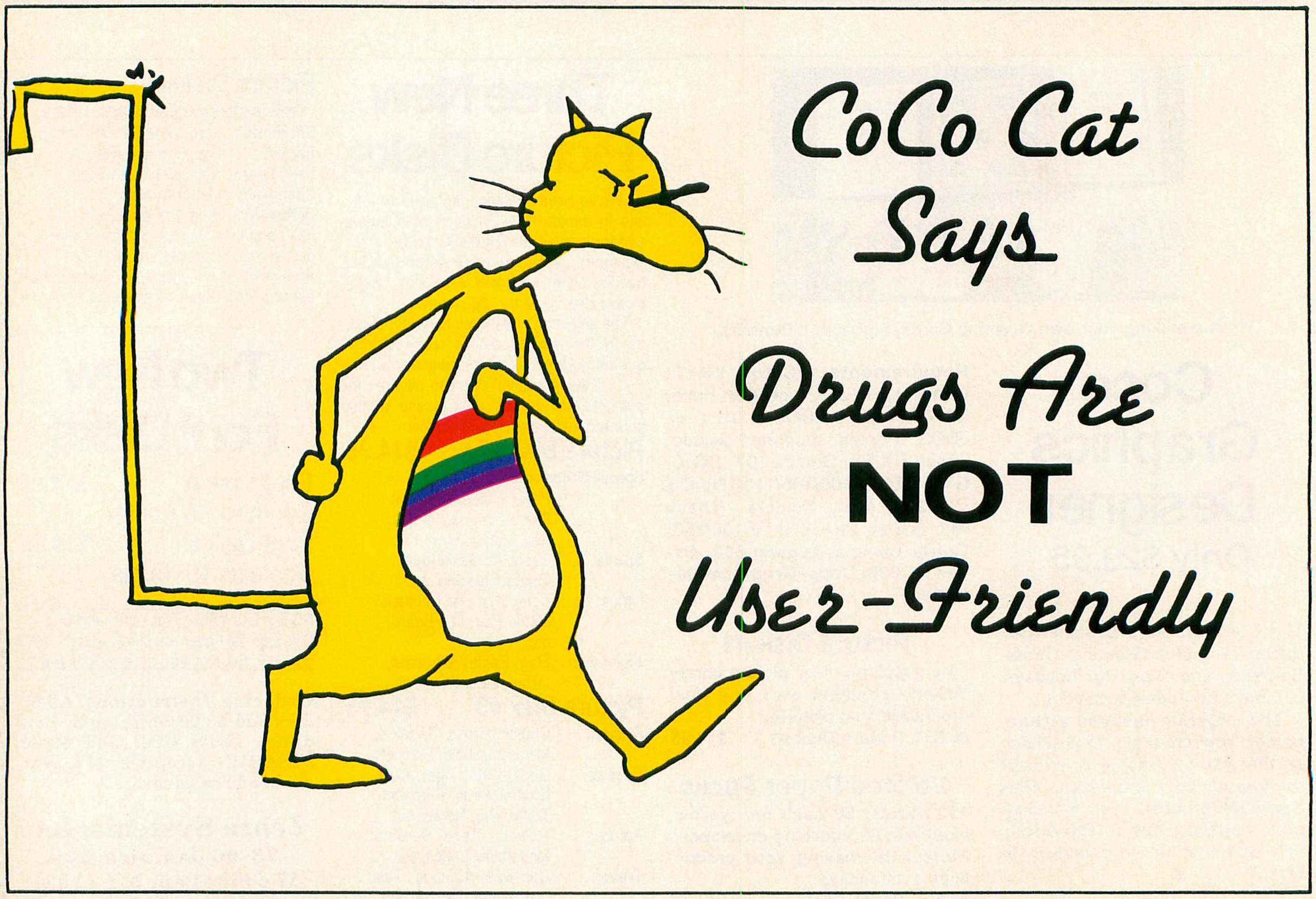
Badwolf gives children an opportunity to learn both the correct order of the letters in the alphabet and their placement on a keyboard. Most important, the program lets children have fun while they learn.

(Questions or comments concerning this program may be directed to the author at P.O. Box 276, Liberty, KY 42539. Please include an SASE when requesting a reply.) ☐

260	252	1300	28
490	7	1550	225
690	89	1820	128
900	116	2060	253
1080	213	END	38

The listing: BADWOLF

```
0 ' BADWOLF    BY RICK COOPER
  C 1987
10 PCLEAR8
20 ON ERR GOTO 2290
30 ON BRK GOTO 2290
40 PALETTE 10,60:'FLESH
50 PALETTE 0,63:'WHITE BACKGROUN
D
60 PALETTE 1,0:'BLACK FOREGROUND
70 PALETTE 9,32:'RED
80 PALETTE 8,17:'GREEN
90 PALETTE 7,34:'BROWN
100 PALETTE 6,7:'GRAY
110 PALETTE 5,4:'BLUE
120 PALETTE 4,61:'PURPLE
130 DIM PS(26,2),WS(11,2),PO(26)
,CR$(26)
140 POKE &HFFD9,0
150 HBUFF 1,500
160 HBUFF 2,700
170 HBUFF 3,500
```



```
180 HBUFF 4,700
190 HCOLOR 1,0
200 GOSUB 2030
210 FOR X=1 TO 24:READ PS(X,1),P
S(X,2):NEXT X
220 FOR X=1 TO 11:READ WS(X,1),W
S(X,2):NEXTX
230 HSCREEN2
240 HCIRCLE(20,20),10
250 HDRAW"BM16,12;H4D5BR16U5G4BD
6D1R1L2BL6L2R1U1"
260 HCIRCLE(20,24),4
270 HCIRCLE(20,24),1
280 HCIRCLE(20,32),3
290 HPAINT(23,27),10,1
300 HPAINT(13,11),10,1
310 HPAINT(27,11),10,1
320 HPAINT(20,23),10,1
330 HDRAW"BM17,30;L1H2L1H2D9E2R1
E2R1BR4R1F2R1F2U9G2L1G2L1"
340 HPAINT(14,32),9,1
350 HPAINT(19,32),9,1
360 HPAINT(25,32),9,1
370 HCIRCLE(50,20),8,,1.5
380 HDRAW"BM45,10;U4H3L2D6F4"
390 HPAINT(43,8),7,1
400 HDRAW"BM55,10;U4E3R2D6G4"
410 HPAINT(57,8),7,1
420 HCIRCLE(47,15),2
430 HCIRCLE(53,15),2
440 HDRAW"BM48,23;U1E1R2F1D1BD3U
1H1L2G1D1BD3U1E1R2F1D1G1L1H1BR6R
5F3L25E3R5"
450 HPAINT(52,30),5,1
460 HPAINT(45,30),5,1
470 HPAINT(50,18),7,1
480 HLINE(70,0)-(70,40),PSET
490 HLINE-(0,40),PSET
500 HPAINT(1,1),4,1
510 HGET(7,7)-(33,37),1
520 HGET(36,2)-(65,35),2
530 HCLS
540 HDRAW "BM25,10;G15E15F15H3U5
L3D3F6D25L31U25BR10BD25U10R6D10"
550 HPAINT(30,30),7,1
560 HDRAW"BM40,52;R5F8R14E9R26E1
0R20"
570 HDRAW"BM18,52;D8R25F8R17E9R2
7E10R21"
580 HDRAW "BM140,10;R3F2D2F3R1F2
R1F2D2F3D2G1D1G2D3G1D2G2D2G3L2G2
D15L8U15H1R11L11H1R2H3U2H2U2H1U3
H2U1H1U2E3U2E2R1E2R1E3U2E2R3"
590 HPAINT(140,30),8,1
600 HPAINT(140,60),7,1
610 HDRAW"BM156,30;E15R35U2R40U2
R37F20D30R2D25G15L35U2L27"
620 HDRAW"BM144,47;R6E22R35U2R40
U2R30F15D25R2D20G10L30U2L31G7"
630 HDRAW"BM260,40;U2E2U1E2U1E3R
```

One-Liner Contest Winner . . .

Use your right joystick to control your horizontal motion as you ski between the trees. Try to get to the lower right-hand corner of the screen. An 'L' means you crashed, and a 'W' means you made it.

The listing:

```
0 CLS:PMODE3:PCLS:SCREEN1:LINE(0
,0)-(255,191),PSET,B:FORS=0TO400
:X=RND(210):Y=RND(166):LINE(X+40
,Y+20)-(X+39,Y+25),PSET:NEXT:X=2
0:Y=1:FORL=0TO999:Y=Y+.2:IFX+Y>4
00THENPRINT"W"ELSEX=X+(JOYSTK(0)
-32)*.03:IFPPOINT(X,Y)<4THENPSET
(X,Y,2):NEXTELSEPRINT"L"
```

Michael Toepke
Oak Harbor, WA

(For this winning one-liner contest entry, the author has been sent copies of both *The Second Rainbow Book of Adventures* and its companion *The Second Rainbow Adventures Tape.*)

Burke & Burke
P.O. Box 1283 Palatine, IL 60078-1283
(312) 397-2898

RAINBOW CERTIFICATION SEAL

Our Famous Hard Disk Interface

We've sold hundreds of our affordable, high-performance CoCo XT and CoCo XT-RTC hard disk interfaces to a very hot Color Computer market in a single year! This year, 1988, is "The Year of the Hard Disk" at Burke & Burke.

The CoCo XT hard disk interface lets you connect up to 2 low cost, PC compatible 5-120 Megabyte capacity hard drives to your CoCo. You buy the drive, Western Digital WD1002-WX1 or WD1002-27X (RLL) controller, and a case from the PC dealer of your choice. Just plug them into the CoCo XT, plug the CoCo XT into your Multi-PAK, and you have a 20 Meg OS9 hard disk system for **under $450!**

Great for multi-user systems! The CoCo XT interface uses advanced "NO HALT" hard disk controllers, which do not halt your CoCo and do not disable or use interrupts during hard disk access. You get full type-ahead, and the system clock does not lose time during hard disk access. Fully compatible with most RS-232 expansion ports!

CoCo XT (with anodized housing, 60 page user manual, hard disk back-up utility and new, Version 2.3 drivers for use with both OS9 & HYPER-I/O) – $69.95. Or choose the **CoCo XT-RTC** (includes real-time clock / calendar with battery backup) -- $99.95

THE PROFESSIONAL TOUCH: XT-ROM – Automatically boots and reboots OS9 from hard disk. Installs in your hard disk controller's BIOS ROM socket -- $19.95.

Now: Hard Disk for BASIC

"Dynamic Disk Interface" runs hard drives, big floppies, and more!

You or someone that you know may have the 35 Track Blues. It strikes hundreds of CoCo users every year. One day you wake up, and say to yourself, "These 35 track floppy disks are just too small."

There's only one cure. More storage. Get it. With HYPER-I/O, from Burke & Burke.

BASIC for the '90's

HYPER-I/O modifies the RS-DOS Disk BASIC in your CoCo 1, 2, or 3 to provide a "Dynamic Disk Interface". Use your existing BASIC and RS-DOS software with hard disk interfaces (CoCo XT, DISTO), RAM Disks, and any mix of floppy drives from 160K to 720K each. Fully RESET protected, user configurable, expandable, OS9 compatible, EPROM-able HYPER-I/O may soon be **THE** system of choice for the CoCo 1, CoCo 2, and CoCo 3. **HYPER-I/O Version 2.5** now available for only $29.95.

HYPER-III (RAM Disk and Print Spooler for CoCo 3 HYPER-I/O) –$19.95

Shipping (within the USA) CoCo XT $2.00; Disk or ROM $1.50. COD's add $2.20.

```
2E2R5F2R1F3D2F1D2F1D2L25"
640 HPAINT(270,35),6,1
650 HDRAW"BM217,95;G20D30G20L30H
30U35H25L30G30D34"
660 HDRAW"BM228,99;G20D30G25L40H
35U35H20L25G25D30L6"
670 HDRAW"BM220,75;U10E5R14F5D10
G5L14H5BR11BD6D6R3U6"
680 HPAINT(225,65),9,1
690 HDRAW"BM222,73"+CR$(19)
700 HDRAW"BM227,73"+CR$(20)
710 HDRAW"BM234,73"+CR$(15)
720 HDRAW"BM240,73"+CR$(16)
730 HDRAW"BM130,120;D20R5U20L5R5
D3R40U3R5D20L5U20D17L5U14L5D14L5
U14L5D14L5U14L5D14L5U14D14L5R35"
740 FORX=2 TO 62 STEP 30
750 HLINE(X,160)-(X+25,190),PSET
,B
760 HLINE(X,160)-(X+13,140),PSET
770 HLINE(X+13,140)-(X+25,160),P
SET
780 NEXT X
790 HPAINT(15,155),9,1
800 HPAINT(45,155),8,1
810 HPAINT(75,155),7,1
820 HDRAW"BM 9,180;E2U1E2U1E2U1E
2U1E2BL10F2D1F2D1F2D1F2D1F2"
830 HDRAW"BM44,180;U8E2U1E2BL8F2
D1F2D1"
840 HDRAW"BM70,180;R10L10E2U1E2U
1E2U1E2U1E2L10"
850 HPAINT(1,1),4,1
860 HCOLOR 9,0
870 HPRINT(31,15),"THE"
880 HPRINT(27,16),"BIG BAD WOLF"
890 HPRINT(31,17),"AND"
900 HPRINT(27,18),"THE SMART PIG
"
910 HCOLOR 1,0
920 J=1
930 K=1
940 GOSUB 1490
950 X1=PS(J,1)
960 Y1=PS(J,2)
970 IF X1=0 THEN 1310
980 GOSUB 1420
990 IF J=24 THEN 1110
1000 IF J=6 THEN K=K+1:GOSUB 161
0:GOSUB 1490:K=K+1:GOSUB 1610:GO
SUB 1490:K=K+1:GOSUB 1610:GOSUB
1490
1010 IF J=12 THEN K=K+1:GOSUB 16
10:GOSUB 1490:K=K+1:GOSUB 1610:G
OSUB 1490
1020 IF J=16 THEN K=K+1:GOSUB 16
10:GOSUB 1490:K=K+1:GOSUB 1610:G
OSUB 1490
1030 IF J=22 THEN K=K+1:GOSUB 16
10:GOSUB 1490:K=K+1:GOSUB 1610:G
OSUB 1490:K=K+1:GOSUB 1610:GOSUB
 1490:GOSUB 1610:SOUND 2,1
```

```
1040 I$=INKEY$:IF I$="" THEN 104
0
1050 IF I$<>CHR$(J+64) AND (J=4
OR J=5 OR J=10 OR J=15 OR J=20)
THEN 1900
1060 IF I$<>CHR$(J+64) THEN 1040
1070 HDRAW"BM"+STR$(PO(J))+",9"+
CR$(J)
1080 J=J+1
1090 GOSUB 1580
1100 GOTO 950
1110 I$=INKEY$:IF I$="" THEN 111
0
1120 IF I$<"X" OR I$>"Z" THEN 11
10
1130 GOSUB 1580
1140 I=ASC(I$)-87
1150 R=RND(3)
1160 X1=(0+(I-1)*30)
1170 Y1=160
1180 HGET(X1,Y1)-(X1+26,Y1+30),3
1190 HPUT(X1,Y1)-(X1+26,Y1+30),1
,PSET
1200 FOR Z=1 TO 100:NEXT Z
1210 X2=(0+(R-1)*30)
1220 Y2=160
1230 HGET(X2,Y2)-(X2+29,Y2+33),4
1240 HPUT(X2,Y2)-(X2+29,Y2+33),2
,PSET
1250 IF I=R THEN 1980
1260 FOR X=1 TO 255 STEP 10
1270 SOUND X,1
1280 NEXT X
1290 FOR Z=1 TO 400:NEXT Z
1300 HPRINT(17,22),"YOU MADE IT
HOME!!"
1310 HPRINT(17,23),"WANT TO PLAY
 AGAIN Y/N"
1320 I$=INKEY$:IF I$="" THEN 132
0
1330 IF I$="N" THEN 2290
1340 IF I$<>"Y" THEN 1320
1350 HCOLOR 4,1
1360 HLINE(0,0)-(319,9),PSET,BF
1370 HLINE(130,176)-(319,191),PS
ET,BF
1380 HCOLOR 1,0
1390 HPUT(X2,Y2)-(X2+29,Y2+33),4
,PSET
1400 HPUT(X1,Y1)-(X1+26,Y1+30),3
,PSET
1410 GOTO 920
1420 REM PUT PIG
1430 HGET(X1,Y1)-(X1+26,Y1+30),3
1440 HPUT(X1,Y1)-(X1+26,Y1+30),1
,PSET
1450 SOUND 200,1
1460 PX=X1
1470 PY=Y1
1480 RETURN
1490 REM PUT WOLF
1500 X2=WS(K,1)
```

```
1510 Y2=WS(K,2)
1520 HGET(X2,Y2)-(X2+29,Y2+33),4
1530 HPUT(X2,Y2)-(X2+29,Y2+33),2
1540 SOUND 2,1
1550 WX=X2
1560 WY=Y2
1570 RETURN
1580 REM BLANK PIG
1590 HPUT(PX,PY)-(PX+26,PY+30),3
,PSET
1600 RETURN
1610 REM BLANK WOLF
1620 HPUT(WX,WY)-(WX+29,WY+33),4
,PSET
1630 RETURN
1640 DATA 12,26
1650 DATA 44,40
1660 DATA 80,40
1670 DATA 110,30
1680 DATA 150,15
1690 DATA 175,10
1700 DATA 210,8
1710 DATA 250,6
1720 DATA 280,14
1730 DATA 290,34
1740 DATA 288,65
1750 DATA 284,75
1760 DATA 255,80
1770 DATA 225,82
1780 DATA 200,90
1790 DATA 195,110
1800 DATA 175,140
1810 DATA 150,155
1820 DATA 110,140
1830 DATA 100,100
1840 DATA 90,70
1850 DATA 60,70
1860 DATA 30,80
1870 DATA 20,105
1880 DATA 126,64,180,44,216,35,2
60,41,216,35,180,55,160,60,140,9
0
1890 DATA 110,80,80,100,40,100
1900 REM GOT EATEN
1910 HDRAW"BM"+STR$(PO(J))+",9"+
CR$(J)
1920 GOSUB 1610
1930 GOSUB 1580
1940 X2=PS(J,1)
1950 Y2=PS(J,2)
1960 HGET(X2,Y2)-(X2+29,Y2+33),4
1970 HPUT(X2,Y2)-(X2+29,Y2+33),2
,PSET
1980 FOR X=40 TO 1 STEP -1
1990 SOUND X,1
2000 NEXT X
2010 HPRINT(17,22),"YOU WERE JUS
T EATEN!!"
2020 GOTO 1310
2030 B=1
2040 FOR X=5 TO 269 STEP 12:PO(B
)=X:B=B+1:NEXT X
2050 CR$(1)="E1U2E1U1E1F1D1F1L3R
3D2F1"
2060 CR$(2)="U6R2F1D2L3R3F1D2L3"
2070 CR$(3)="BU1F1R2E1G1L2H1U4E1
R2F1"
2080 CR$(4)="U6R3F1D4G1L3"
2090 CR$(5)="R4L4U3R2L2U3R4"
2100 CR$(6)="U3R2L2U3R4"
2110 CR$(7)="R4U2L1R1D2L4U6R4D1"
2120 CR$(8)="U6D4R3U4D6"
2130 CR$(9)="R5L3U6L2R5"
2140 CR$(10)="U2D2R3U6L2R4"
2150 CR$(11)="U6D4E3G2F3"
2160 CR$(12)="R4L4U6"
2170 CR$(13)="U6D1F3E3U1D6"
2180 CR$(14)="U6D1F4D1U6"
2190 CR$(15)="U6R4D6L4"
2200 CR$(16)="U6R2F1D2G1L2"
2210 CR$(17)="U6R4D6L4BE2F2R1"
2220 CR$(18)="U6R2F1D2G1L2R1F2"
2230 CR$(19)="R3E1U2L3H1U1E1R3"
2240 CR$(20)="BR3U6L2R5"
2250 CR$(21)="BU1U5D5F1R2E1U5"
2260 CR$(22)="BU6F2D1F2D1U1E2U1E
2"
2270 CR$(23)="BU6D1F1D1F2U1E3D1F
3E2U1E1U1"
2280 RETURN
2290 POKE &HFFD8,0
2300 END
```

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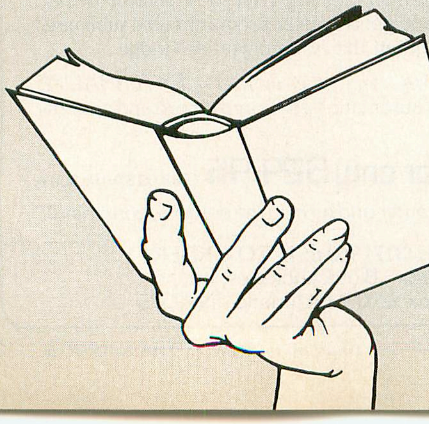

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CoCo's Future Looks Clear and Bright at Chicago RAINBOWfest

The 15th RAINBOWfest opened in Chicago, Illinois on May 20th, 1988. Attendance was strong throughout the three-day event. There were plenty of familiar faces and quite a few new ones, too. As people came through the exhibit hall door, it was clear that the only subject on everyone's mind was CoCo.

When not taking advantage of the seminars or other meetings, people took time to make new acquaintances and chat with old friends. Of course, there were bargains at every booth (and many didn't cost a penny — the information shared at the show was immense). Any attendee could have walked away *filled* with knowledge about a favorite machine. This is what the CoCo Community is all about.

On Saturday, one attendee was overheard in the exhibit hall saying, "This is just like going to DisneyWorld!" And it was. There were so many choices that it seemed there wouldn't be enough time to do everything. With all the things to do — the seminars, the CoCo Cat Sandbox, the CoCo Community Breakfast, voting on the entries to The CoCo Gallery Live and meeting all the CoCo notables — everyone seemed satisfied at the close of the show on Sunday afternoon. They did all that they came to do. Perhaps you will, too, when the CoCo Community joins together again in Princeton this October.

A crowd of about 10,000 was in attendance at this year's Chicago show.

CoCo Community Breakfast: Looking Back and Looking Ahead

At the Saturday morning CoCo Community Breakfast, Kip Bryan, Vice President of General Videotex Corporation (Delphi), spoke about the growth of online communication services. The address covered where the telecommunications industry has been, where it is now and where it is going. According to Kip, the current trends include use of online graphics and interactive online games.

In the future, we can expect 9600-baud modems and 56-Kilobit Integrated Services Digital Networks (ISDNs). Work has also begun for "gateway" networks through major telephone companies. These services will allow consolidated billing and immediate access to your choice of online services.

After Kip's keynote address, Lonnie Falk invited the breakfast crowd to join in a CoCo sing-along. The *I was here in . . .* song progressed one year, beginning with the first RAINBOWfest in 1982. The attendees rose in accordance with the year in which they first attended a 'fest. Of course, when the sing-along was finished (the last verse sung was 1989 — *we all hope to be there*), all were on their feet. This certainly was a new and fun way to bring the breakfast to a close.

Speech Systems Opens the Show

A common sight (and sound) at Chicago shows is Speech Systems. The 'fest doesn't seem to get started until *The Star Spangled Banner* has been reproduced by the various electronic devices found at this booth. Music master Cecil Houk wowed the crowd with synthesizer antics, while owner Rich Parry offered substantial savings across the board on Speech Systems' products.

CoCo Gallery Goes Live!

Logan Ward, who helped organize the first CoCo Gallery Live contest, found time to cast his vote in the competition.

Immediately following the '87 Princeton show, Logan Ward of The Computer Center suggested RAINBOW sponsor an art contest at the next 'fest. As the well-received idea jelled, Logan got down to the task of helping to organize the event. In the months prior to the show, Logan, along with RAINBOW Managing Editor Jutta Kapfhammer, spent a great deal of time planning entry guidelines and even built the colorful display used to exhibit the artwork at the show.

Logan said, "The graphics creations here are incredible. This is some of the best CoCo artwork I have ever seen. And, for a premier event, the turnout and crowd acceptance is wonderful." Logan attributed part of the live Gallery's success to the crowd participation. He said, "Since the winners were picked by the attendees, enjoyment of the contest wasn't limited to the entrants."

With more than 70 entries at the Chicago show, CoCo Gallery Live is considered a real success. It will be back at future RAINBOWfests, so start exercising your artistic talents now. For a look at the winning creations, turn to Page 26 of this issue.

All's Well in the OS-9 Market

Clearbrook Software Group was on hand taking orders for products from its line of OS-9 software and utilities. Paul Kehler of Clearbrook said, "I see an equilibrium between OS-9 and Disk BASIC forming. It appears that the interest in OS-9 is leveling out, and we no longer have that mad rush to the system. Those people who are comfortable with OS-9 are staying, and others are holding their own with Disk BASIC." It speaks well for a market when the consumers are taking a little more time and looking at all of their options and alternatives.

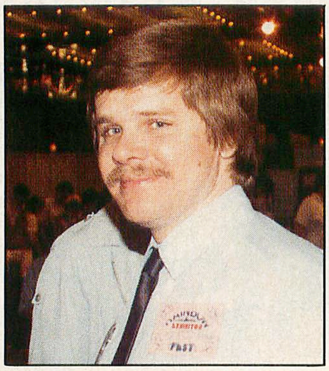
The OS-9 Users Group, with David Kaleita at the helm, was selling T-Shirts and group memberships and giving away copies of the new *Multi-Vue* enhancement shells, *Shell*+ and *GShell*+, to UG members.

Delphi Family Reunion

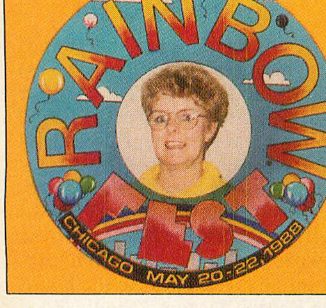
As usual, it was standing room only at Delphi's booth. Kip Bryan, Paul Hodosh and John Gilbert of Delphi were on hand to answer general questions. In addition to offering lifetime subscriptions, Delphi sold the new book by Michael Banks, *DELPHI The Official Guide*.

Those having questions more specific to the CoCo SIG talked to Marty Goodman, Don Hutchison and a host of others. Many people took the opportunity to place faces and voices with familiar usernames. It is unfortunate that all 7,000+ CoCo SIG members weren't there for a "family portrait."

To promote the family environment, Delphi members were invited to attend "The Delphi Saturday Night Get Together." This gave Delphi users the opportunity to sit down and really talk without trying to overcome the madhouse atmosphere of the exhibit hall. And the free refreshments were a welcome sight after a long day.



Delphi vice president Kip Bryan delivered the keynote address.



This was the first show for the RAINBOWfest photo buttons. For just $4, this memento was a really hot item to have. And 'fest goers will be able to add to the collection at future shows.

New Games Were a Big Hit!

Many RAINBOWfest attendees enjoyed the chance to try — and purchase — the games offered by Diecom Products. While David Dies (president of Diecom) offered suggestions, several people played *Iron Forest*. While this program was introduced earlier, the Chicago '88 show was the first chance most in the CoCo Community had to see this arcade-style action game utilizing a light-phaser gun. For many, it was the first time they had used any type of light phaser to interact with a computer. At the show, Diecom sold its $28.95 games for $23.95.

RAINBOWfest attendees have learned to expect the exciting and unusual from SRB Software, which introduced more action-packed CoCo 3 games at this show. SRB's wares included *Mine Rescue*, *Bash* and *Warp Fighter 3-D*. Adding to the excitement, the booth sported a clamp-on "cockpit" for use against the many space enemies. And for extra effect, owner Steve Bjork's partner, Monique Ellison, spent most of the weekend wearing a "tailor-made" Star Trek costume. As far as SRB's pricing policy is concerned, during the show, owner Steve Bjork got bold and announced: "No reasonable offer will be refused." And none were.

Steve Bjork of SRB Software drew a crowd of special effects fanatics with *Warp Fighter 3-D*, glasses and all.

Peripherals Galore!

Sales were brisk at The Computer Center booth as bare half-height drives went for just $49. Logan Ward, head technician for The Computer Center, sees "an interesting move toward hard drive systems. As the price comes down and the end users increase their knowledge, this item seems to be a logical and rapidly approaching step in the advancement of the CoCo."

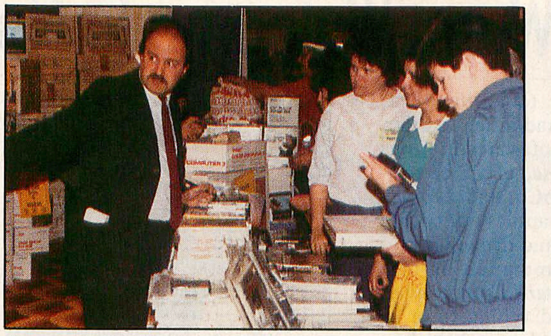
Sharing a booth with The Computer Center was Spectro-Systems, back with its excellent Disk BASIC replacements, ADOS and ADOS-3 (for the CoCo 3.) The interest in this system has risen with the increased interest in power-usage and double-sided drives. As a show bonus, multi-CoCo owners could get both versions of ADOS for $45.

Bargains abounded at the South Western Digital booth, and all sales pointed toward the future. Kevin Franciotti of South Western Digital sees a great future in the newer drive systems: "There really is a lot of interest in the 3½-inch, 720K drives." In addition to disk drives and controllers, a Magnavox 8CM515 monitor, complete with cable, sold for just $279.

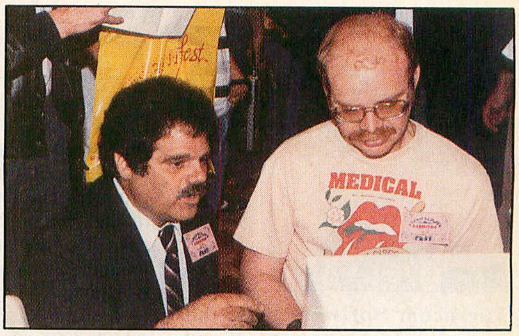
At Computer Plus, a 128K CoCo 3 could be purchased for just $129. While the CoCo 3 was selling strong, many at the show took the opportunity to upgrade their systems with peripherals. For instance, as in past 'fests, the Magnavox 8CM515 sold well. Other specials from Computer Plus included bare 512K upgrade boards for just $10 and full-featured printers (Star NX-10 and Citizen 120-D) for $179.

Glenside Lends a Hand

The Glenside Color Computer Club was kept busy selling RAINBOWfest T-shirts at the Chicago show. (The response for the shirts was overwhelming.) Glenside also offered club memberships and newsletters to the 'fest attendees. The newsletter contained a humorous flowchart detailing the trials and tribulations of late-night programming as seen by the club president, Ed Hathaway.



As usual, Radio Shack drew a large crowd of bargain hunters to its oversized booth at the Chicago show.



Tom DiMarco of Gimmesoft, *left*, compares notes with Marty Goodman.

Cer-Comp Introduces Disk BASIC Windows

Cer-Comp became very active when the CoCo 3 was introduced in mid-1986. Since that time it has provided the CoCo Community with *CBASIC III Editor/Compiler*, *Hi-Res III Screen Commander*, *DataPack III Plus* and *TextPro IV*. Now it's added an exciting new windowing user interface under Disk BASIC to its product line. This system, *Window Master*, is designed to run in 512K (at press time, Cer-Comp was working on a 128K version) and at the same time does not take up any user-available BASIC memory. Other features include multiple windows, pull-down menus, buttons, icons and edit fields. The system adds its own commands to the CoCo 3 to allow event processing.

While true multitasking on the CoCo is accomplished under OS-9, *Window Master* offers the diehard Disk BASIC user access to a very user-friendly environment. We look to the future to determine the success of a package such as *Window Master*. But the future has been brought to the present with its introduction. It will be great to see *Window Master* applications appear on the CoCo market as programmers work to tap the power of this new product. It really is impressive to see something done that many have said couldn't be done.

Brandon Holt and CoCo Cat reunited one year later.

Growing to Meet the CoCo Community's Needs

Disto introduced two hot new items at the show: the Super Controller II, a no-halt disk controller, and the RS-232 Super Pack, an ACIA-driven serial card compatible with Radio Shack's now discontinued Deluxe RS-232 Pak. The Super Pack sold at the show for just $35.

In keeping with the expandable design of the Super Controller, Tony DiStefano expects to complete a Serial/Parallel/Real Time Clock add-on board (it should be available by now). By the end of the year, Tony also hopes to have available a four-in-one add-on that includes a hard drive interface. Tony explained, "With the drastic increase in interest in hard drive systems, many people have expressed a desire for such a device."

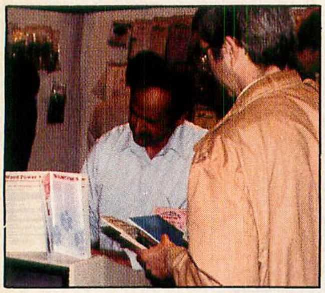
The growth of Gimmesoft's product line seems proof that the company is doing things right. Besides having its full line available at the show, Gimmesoft displayed its new terminal program, *V-Term*. Written for the CoCo 3, *V-Term* rivals VT-52 and VT-100 terminals and will allow full use of all memory in a 512K machine.

At the Public Domain Software booth, a disk full of utilities, applications or entertainment files went for $5; three disks for $12 (a 50-percent savings).

T&D Subscription Software took reduced rate subscription orders for its growing line of software. Recent additions include a gambling package, an electronics tutorial, game packages and even a CoCo 3-only package. To keep the line growing, owner Tom Dykema is always ready to hear suggestions. He said, "The 'fests are the best source of new ideas around!"

RAINBOWfest coordinator Ira Barsky, *left*, explores disk controllers with Disto's/CRC's Tony DiStefano.

A Warm Welcome to New Vendors



Microcom Software took the opportunity to present *Word Power 3.1* to the 'fest attendees. This multi-featured word processor is designed for the CoCo 3 and sells for $79.95. Microcom also offered showgoers a 15-percent saving on all items.

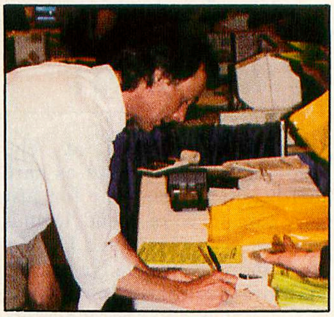
Tom Mix Software sold combined games packages (five games in each) for just $45. Breaking with tradition, Mix now offers the complete VIP line of CoCo applications software.

A newcomer to RAINBOWfest, E.Z. Friendly, had much to offer. Its variety of software offerings included *Enigma*, a cipher program for the CoCo, and *Leonardo's Pencil*, a graphics utility that converts free-hand drawings into BASIC DRAW commands. A new product, *Keyboard Commander*, is a game-based typing tutor in which you use the keyboard as your spaceship controls and shoots down attacking letters and words. The action and graphics certainly make you forget that you are trying to *learn* something.

Also at its first show, Granite Computer Systems sold its utilities package, which transfers files between MS-DOS, OS-9 and FLEX. Two versions of this package were available: one for use with *out-of-the-carton* OS-9, and the other designed to work with *Multi-Vue*.

If you wanted the perfect gift for someone who has everything, your best bet was to stop by the Specialty Projects booth. Offerings included picture disks from the *Art Deli* that contained hundreds of different PMODE4 images, disk boxes in bright colors, wooden disk racks, mouse mats and even cross-stitch patterns.

Lonnie Falk and Computer Villa's Terry Simons.



Ed Hathaway, of Second City Software, makes another sale.

The hot items at the Second City Software booth included *Check09* for $19.95 and *BSE* (*BASIC Screen Editor*) for $15.95. While *Check09* is designed to directly interface with *Multi-Vue*, *BSE* allows full-screen editing. A relative newcomer to the CoCo market, Second City looks good. We hope to see more in the future.

A strong runner in the no-halt disk controller market is Performance Peripherals. Its dual-mode controller features two switchable ROM sockets (one 24-pin and one 28-pin) and 8K memory cache (expandable to 32K.) Only for about the last year has no-halt technology been seen in the CoCo Community. But as OS-9 gains popularity, the preservation of the type-ahead buffer through the use of this technology has become much more desirable. In some cases it can even be considered a necessity. And Performance Peripherals has provided an excellent alternative to CoCo disk users.

Another newcomer in Chicago was Computer Villa. This company was offering *Home-Pac*, a household software package for personal bookkeeping. The 80-column, CoCo 3 package, written by Computer Villa owner Terry Simmons, was going at a show price of $39.95. Other offerings included a full range of utility software from Bob Van der Poel.

Hard Drive Sales Going Strong

One of the current groundbreakers in the CoCo hard drive arena is Burke & Burke of Palatine, Illinois. This "mom and pop" company has provided the Community with a well-designed, inexpensive opportunity to hook a hard drive to the CoCo. And, while the system is aimed at the OS-9 user, the CoCoXT and CoCoXT-RTC interfaces allow compatibility with most Disk BASIC software through the use of *Hyper-I/O*.

Chris Burke also showed some other up-and-coming products: *Wild*, a wildcard utility for OS-9, *EZGen*, an interactive bootfile editor, and *RSB*, a gateway from Disk BASIC designed to make life easier for the novice OS-9 user.

As hard drive systems were a major aspect of this show, the people from Arizona Small Computer Peripherals came to deliver. They offered a complete 20-Meg system (including a Disto interface and OS-9 drivers) for $350 and the bare CMI 6426 20-Meg drive for only $150. Realizing most users don't want to be *stuck* using just OS-9, owner Jim Blanden said his company would be supporting Disk BASIC "in the very near future."

Frank Hogg Laboratory presented its line of high-speed hard drive systems. Frank Hogg believes "there is more than just interest in hard drives . . . people are buying them up across the market!" It would seem that the *fear* of hard drives is rapidly diminishing.

Frank also had some great software deals. *The Wiz* was only $50, and *DynaStar* was going for just $75. But the big news was *Sculptor*, a fourth-generation database language. FHL gave away this $450 item for $120.

Howard Medical offered complete hard drive systems for only $499 at the Chicago 'fest. And according to Ross Litton, manager of Howard Medical, now is the time to buy a hard drive. Ross explained, "If there is an era for the hard drive, it has arrived. I see purchasing a hard drive as a commitment to the machine."

Learning With CoCo

Education was the cat's meow as the CoCo Cat Sandbox went off without a hitch for the third show in a row. Children (of all ages) were delighted to sit in front of a CoCo and learn during the four Sandboxes offered at this year's Chicago 'fest.

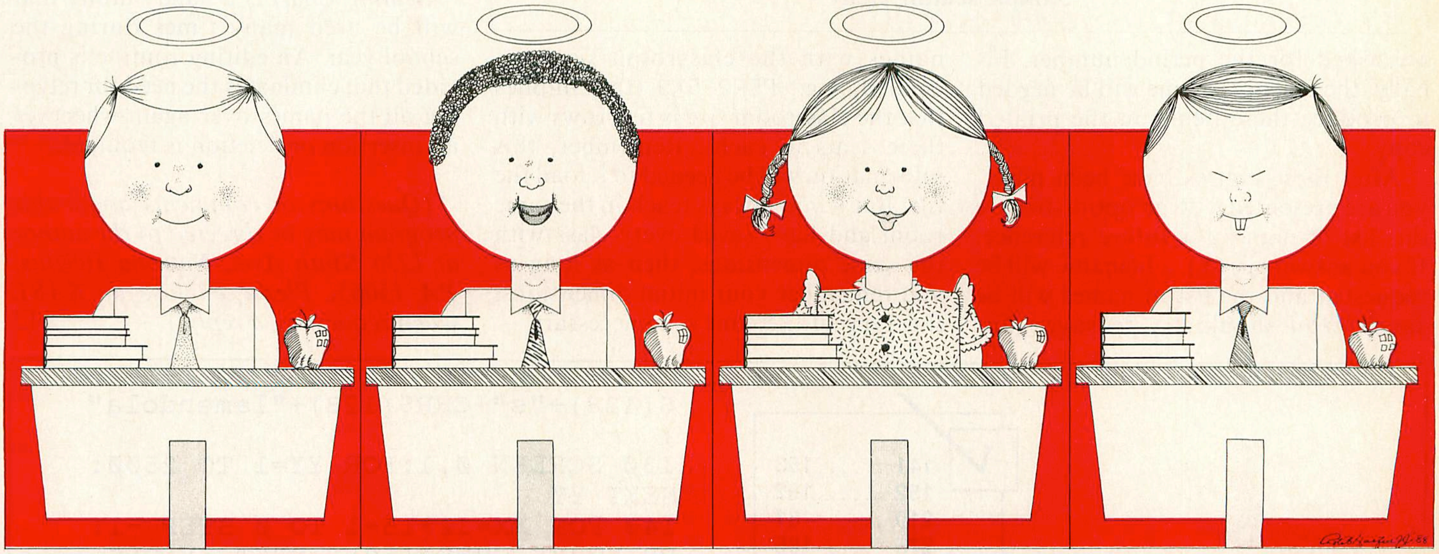
While CoCo education was the main point at the Sandboxes, emphasis at the Sugar Software booth was more of a "readin', 'ritin' an' 'rithmetic" nature. Gary Davis created an educational package consisting of *Galactic Hangman*, *Silly Syntax*, *Presidents of the United States*, *The Great USA* and *Trig Attack* (a very popular game by itself) that sold for $29.95. If you were looking for more than educational products, Sugar Software was also selling a combination package for its *Calligrapher* software for $69.95.

Veronica Harder and Stephanie, David and Peggy Brach, take advantage of the Educational Sandbox.

It's school time — do you know where your children sit?

A SEAT FOR EVERYONE & EVERYONE IN HIS SEAT

By Donald A. Turowski



When school starts, a certain series of events necessarily follow — parents rejoice, children complain, and teachers make out seating charts! This is a dreaded yet important task for most teachers, because for the next school year, day in and day out, attendance in various classes *must* be taken — knowing where Johnny is supposed to be sitting certainly keeps things in order.

But the seating chart you make out the first day of school will invariably mutate many times, quickly becoming a maze of arrows and scratched-out names. The initial class shuffle of students changing their schedules (after realizing that Algebra I is a lot harder than 2 + 2, etc.) means that keeping an accurate seating chart for yourself or a substitute is almost an impossible task.

Well, CoCo is coming to the rescue with *Seating Chart*, a program that will generate a printed copy of your seating chart and much more! All you need is a 16K Color Computer with a single disk drive and a printer. With this program and your CoCo, you can keep an up-to-date version of your seating chart on hand at all times with a minimum of effort.

First, of course, type in, save and load the program. No special commands are needed. Enter `RUN` and a title screen appears, followed by a series of short instructions describing the program.

The first entry to be made is the number of rows of seats in the classroom. Due to printer limitations, a maximum of five rows are permitted (lines 150 to 152). Then the number of seats in each row are entered. For example, if your classroom has six seats in each row, but you use only four per row, you may choose to input 4. A word of advice: If throughout the year you usually gain students, input a larger number of seats per row to allow for later additions.

The CoCo uses these dimensions to define an array of names to be stored on disk for future reference and editing. Also, this array size is needed to load previously saved classroom seating charts for editing.

To generate a chart, you will be asked to enter the first name of each child and then his or her last name. For example, you would enter `JOHNNY` and then `SMITH`. The CoCo would then present you with your entry and ask if it is OK to proceed. By answering no (N), you would be given a chance to correct your entry as needed. Also, *Seating Chart* will print onscreen the location of your entry as you proceed — Row 1, Seat 3, etc.

If your entry is too long, you are alerted to re-enter it in a shorter version. A maximum of 15 characters each for first and last names are allowed to achieve the formatted, printed copy.

Once the names are entered, you will be asked for the class name, such as Algebra I or English 101, etc. Then, you

---

Donald Turowski has a bachelor's degree in education and teaches algebra and computer literacy in the Burrells School District in Natrona Heights, Pennsylvania. He is married and has two children.

```
Mr. Casey Stengel
                              Baseball 101

  <<BACK OF ROOM>>                                          <<BACK OF ROOM>>
                 ----------------------------------------------

                 TED               WILLIE            LOU
                 WILLIAMS          MAYS              GHERIG

                 ----------------------------------------------

                 ROBERTO           YOGI              PETE
                 CLEMENTE          BERRA             ROSE

                 ----------------------------------------------

                 BABE              MICKEY            DON
                 RUTH              MANTLE            DRYSDALE

                 ----------------------------------------------

                                 <<FRONT OF ROOM>>

Baseball 101                               NUMBER OF STUDENTS = 9
```

Sample seating chart

are asked for the period number. Finally, the teacher's name will be needed to produce these items on the printed copy.

After these entries have been made, you are presented with an option to save this list of names for future reference. If you answer yes (Y), a filename will be requested and the list of names will be saved. You should try to save your names with the classroom size embedded, e.g., `PER2-5X3` (this implies that the classroom size is five rows with three seats in each). Remember, this information will be needed to reload the file. But if you always teach in the same room and have saved every class with the same dimensions, then as long as you remember your initial dimensions, this type of filename is unnecessary — as long as you remember your initial dimensions.

Now comes the part you've been waiting for — the hard copy of your seating chart. The CoCo will internally check to see if your printer is on and alert you if it is not. Also, it will prompt you to line up the blank sheet in the printer (lines 6000 through 6050).

Sit back and watch. Your seating chart with all its appropritate titles will print out on the sheet, and the program will give you the option of printing out another copy for your records. If no other copies are required, an option to rerun the program is then offered.

Seating Chart is a handy utility that will be used many times during the school year. An editing routine is provided that eliminates the need for retyping all the names over again whenever an insertion or deletion is required.

(Questions or comments about this program may be directed to the author at 1236 Ninth Ave., Natrona Heights, PA 15065. Please enclose an SASE when requesting a reply.) ☐

141	153
152	192
210	81
275	185
370	127
2060	4
3100	53
4010	56
END	235-

The listing: `SEATCHRT`

```
10 '**************
20 '*  SEATING    *
30 '*   CHART     *
40 '* GENERATOR   *
50 '*     BY      *
60 '*D.A.TUROWSKI*
70 '* NOV. 1987   *
80 '**************
90 CLEAR 5000
95 NS=0
100 CLS(RND(8)):PRINT@32*8+4,"se
ating"+CHR$(128)+"chart"+CHR$(12
8)+"generator";
110 PRINT@32*9+14,"by";
120 PRINT@32*10+9,"d"+CHR$(128)+
"a"+CHR$(128)+"turowski";
121 PRINT@32*13+10,"disk"+CHR$(1
28)+"version";
125 PRINT@32*15+2,"suggestions"+
CHR$(128)+"by"+CHR$(128)+"r"+CHR
$(128)+"s"+CHR$(128)+"lamendola"
;
130 SCREEN 0,1:FOR YY=1 TO 2500:
NEXT YY
140 FOR XX=32*16-1 TO 0 STEP -1:
PRINT@XX,CHR$(150);:NEXT XX:CLS
141 PRINT"THIS PROGRAM WILL GENE
RATE A     SEATING CHART FOR YOUR
 CLASS.    IN ORDER TO BEGIN THIS
 PROGRAM,  YOU MUST ENTER THE NUM
BER OF     ROWS OF SEATS AND THE
NUMBER OF SEATS IN EACH ROW IN Y
OUR CLASS.":PRINT"PRESS ANY KEY
TO CONTINUE...":EXEC44539
142 PRINTSTRING$(32,128):CLS:PRI
NT"IF POSSIBLE, TRY TO INCORPORA
TE THIS SIZE INTO THE NAME YOU G
IVETO THIS LIST WHEN ASKED IN TH
E  PROGRAM, SUCH AS 'PER2-5X6' T
O  DESIGNATE 5 ROWS WITH 6 SEATS
!"
143 PRINTSTRING$(32,128):PRINT"T
HIS UTILITY ALSO HAS AN EDITINGF
EATURE TO ALLOW CHANGES OR     D
ELETIONS!":PRINT@32*14,"PRESS AN
Y KEY TO CONTINUE...":EXEC44539
150 CLS(RND(8)):PRINT"ENTER THE
NUMBER OF ROWS OF       SEATS IN T
HE CLASSROOM (MAXIMUM IS 5)":INP
UT R:GOSUB 4000
151 IF R>5 THEN PRINT"SORRY, YOU
 MUST ENTER A NUMBER  LESS THAN
OR EQUAL TO 5 FOR THE SEATING CH
```

```
ART TO FIT ON THE       PRINTER!":
FOR YY=1 TO 3500:NEXT YY:GOTO 15
0
152 IF R<1 THEN PRINT"SORRY, INV
ALID NUMBER OF ROWS.  TRY AGAIN!
!!":FOR YY=1 TO 3000:NEXT YY:GOT
O 150
160 PRINT:PRINT"ENTER THE NUMBER
 OF SEATS         (MAXIMUM) IN EAC
H ROW";:INPUT S:PRINTSTRING$(32,
"=")
165 IF R=3 THEN V=16 ELSE V=0
170 DIM LN$(R,S),F$(R,S)
171 CLS(RND(8)):INPUT"DO YOU HAV
E THIS SEATING CHART  PREVIOUSLY
 SAVED ON DISK";R$:IF LEFT$(R$,1
)="Y" THEN 3000
175 CLS(RND(8)):PRINTSTRING$(32,
128);
180 PRINT"YOU WILL NOW BE ASKED
TO ENTER  THE NAMES OF THE STUDE
NTS IN    YOUR CLASS BY ENTERING
 THEIR    FIRST NAME AND THEN TH
EIR LAST  NAME."
181 PRINTSTRING$(32,128);:FOR YY
=1 TO 2500:NEXT YY
190 PRINT"note-->FOR THIS PROGRA
M, ROW 1, SEAT 1 REFERS TO THE F
ARTHEST   ROW ON YOUR LEFT AS YO
U STAND   IN FRONT OF YOUR CLASS
 AND OF   COURSE THE FIRST SEAT
IN THAT   ROW."
195 PRINTSTRING$(32,128);:FOR YY
=1 TO 3000:NEXT YY
200 FOR XX=1 TO 1000:NEXT XX:PRI
NT@32*14,"PRESS ANY KEY TO CONTI
NUE.....":EXEC44539
210 CLS(RND(8))
220 FOR X=1 TO R
230 FOR Y=1 TO S
240 PRINT"ENTER first name FOR:"
:PRINT" ROW ";X;", SEAT";Y:INPUT
F$(X,Y):IF LEN(F$(X,Y))>15 THEN
 PRINT"NAME TOO LONG!  PLEASE RE
-ENTER!":GOTO 240
250 PRINT"ENTER last  name FOR:"
:PRINT" ROW ";X;", SEAT";Y:INPUT
 LN$(X,Y):IF LEN(LN$(X,Y))>15 TH
EN PRINT"NAME TOO LONG!! PLEASE
RE-ENTER!":GOTO 250
251 PRINTF$(X,Y);" ";LN$(X,Y):PR
INT"correct (y/n)":INPUT R$:IF F
$(X,Y)<>"" THEN NS=NS+1
252 IF LEFT$(R$,1)="Y" THEN 255
ELSE 240
255 PRINTSTRING$(32,"=")
260 NEXT Y
270 NEXT X
271 CLS(RND(8)):PRINT STRING$(32
,"-")
275 PRINTSTRING$(32,128):PRINT"P
LEASE ENTER CLASS NAME AT THIS T
IME (MATH, ENGLISH, ETC.)":LINE
INPUT CL$
276 PRINT"NOW ENTER THE PERIOD N
UMBER":INPUT P$
277 PRINT"NOW ENTER THE TEACHER'
S NAME":INPUT T$
280 PRINTSTRING$(32,128);:PRINT"
DATA ENTRY COMPLETED!!":PRINT"DO
 YOU WANT TO SAVE OR          RE
-SAVE THIS LIST OF NAMES?":LINE
INPUT R$:IF LEFT$(R$,1)="Y" THEN
 2000
281 GOSUB 6010:CLS(RND(8)):PRINT
@32*8,STRING$(32,128);:PRINT@32*
8+6,"printing"+CHR$(128)+"in"+CH
R$(128)+"progress";
284 Z=LEN(CL$):TP=(80-Z)/2
285 PRINT#-2,T$,,,,"PERIOD ";P$:
PRINT#-2,TAB(TP);CL$:
286 PRINT#-2:PRINT#-2:PRINT#-2,T
AB(2);"<<BACK OF ROOM>>";TAB(63)
;"<<BACK OF ROOM>>"
287 PRINT#-2,TAB(V);STRING$(LL,"
-")
288 PRINT#-2
290 FOR Y=S TO 1 STEP -1
300 FOR X=1 TO R
```

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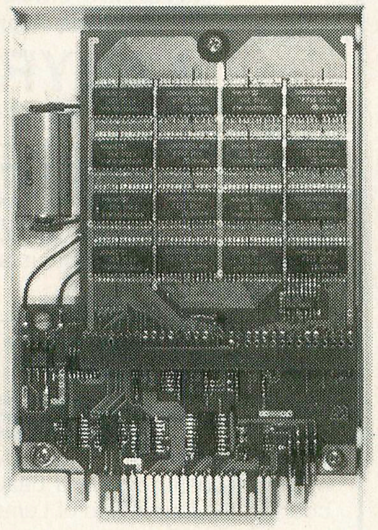
```
310 PRINT#-2,TAB(V);F$(X,Y),
320 NEXT X
325 PRINT#-2
340 FOR X=1 TO R
350 PRINT#-2,TAB(V);LN$(X,Y),
360 NEXT X
370 PRINT#-2:PRINT#-2:PRINT#-2,T
AB(V);STRING$(LL,"-"):PRINT#-2
380 NEXT Y
381 PRINT#-2,TAB(32);"<<FRONT OF
 ROOM>>":PRINT#-2:PRINT#-2:PRINT
#-2,CL$;TAB(40);"NUMBER OF STUDE
NTS =";NS
384 PRINT@32*8,STRING$(32,128);:
PRINT@32*8+7,"printing"+CHR$(128
)+"completed";
385 PRINT@32*13,"DO YOU WANT ANO
THER COPY (Y/N)";:INPUT R$:IF LE
FT$(R$,1)="Y" THEN 281
386 PRINT@32*13,"DO YOU WANT TO
RE-RUN THIS       PROGRAM";:INPUT
 R$:IF LEFT$(R$,1)="Y" THEN RUN
ELSE END
390 END
2000 REM ROUTINE TO SAVE LIST OF
 NAMES FOR SEATING CHART
2005 PRINT STRING$(32,"=")
2010 INPUT"ENTER A NAME FOR THIS
 LIST.     THE NAME MUST HAVE 8
OR LESS     LETTERS!";N$
2020 IF LEN(N$)>8 THEN PRINT "IN
VALID FILENAME- TRY AGAIN!":GOTO
 2010
2030 OPEN "O",#1,N$
2040 FOR X=1 TO R
2050 FOR Y=1 TO S
2060 WRITE#1,F$(X,Y),LN$(X,Y)
2070 NEXT Y
2080 NEXT X
2085 CLOSE #1
2090 PRINTN$;" IS SAVED TO DISK!
!":SOUND 200,2:FOR XX=1 TO 1500:
NEXT XX:FL=1:GOTO 3015
3000 REM ROUTINE TO LOAD PREVIOU
S FILE NAMES
3010 PRINTSTRING$(32,"-"):INPUT"
ENTER THE NAME OF THE
LIST";N$
3011 IF LEN(N$)>8 THEN PRINT"INV
ALID FILENAME, PLEASE       RE-
ENTER!!":GOTO 3010
3015 PRINTSTRING$(32,"-"):NS=0
3020 OPEN "I",#1,N$
3030 FOR X=1 TO R
3040 FOR Y=1 TO S
3050 INPUT#1, F$(X,Y),LN$(X,Y)
3055 IF FL=1 THEN 3065
3060 PRINT F$(X,Y);" ";LN$(X,Y)
```



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```
3065 IF F$(X,Y)<>"" THEN NS=NS+1
3070 NEXT Y
3080 NEXT X
3090 CLOSE #1
3091 IF FL=1 THEN 281
3095 PRINTSTRING$(32,"-")
3100 REM EDITING ROUTINE
3110 INPUT"DO YOU WANT TO CHANGE
 ANY OF    THESE SEATS AT THIS T
IME";R$:IF LEFT$(R$,1)="Y" THEN
3120 ELSE 275
3120 PRINT"PLEASE ENTER THE LOCA
TION OF THESTUDENT'S SEAT THAT Y
OU WANT TO CHANGE":INPUT"ROW #";
X:INPUT"SEAT #";Y
3130 PRINT "THE STUDENT IS:":PRI
NTF$(X,Y);" ";LN$(X,Y):INPUT "IS
 THIS CORRECT";R$:IF LEFT$(R$,1)
="Y" THEN 3140 ELSE 3120
3140 PRINT:PRINT"ENTER THE first
 NAME OF THE     STUDENT WHO WIL
L now BE         SITTING IN THIS
 SEAT instead of ";F$(X,Y);" ";L
N$(X,Y)
3150 INPUT F$(X,Y)
3160 PRINT"NOW ENTER THEIR last
NAME":INPUT LN$(X,Y)
3170 PRINT"STUDENT IS REPLACED B
Y:":PRINTF$(X,Y);" ";LN$(X,Y)
3180 PRINT"ANY MORE CHANGES (Y/N
)":INPUT R$:IF LEFT$(R$,1)="Y" T
HEN 3120ELSE 275
4000 REM ROUTINE TO SET PRINTED
LINE WIDTH
4010 IF R=5 THEN LL=80
4020 IF R=4 THEN LL=64
4030 IF R=3 THEN LL=48
4040 IF R=2 THEN LL=32
4050 IF R=1 THEN LL=16
4060 RETURN
6000 REM ROUTINE TO CHECK FOR PR
INTER READINESS
6010 CLS:PRINT@32*3,"1)TURN ON P
RINTER":SOUND 200,3:FORXX=1TO100
0:NEXT XX:IF PEEK(65314)/2<>INT(
PEEK(65314)/2) THEN PRINT@32*11+
6,"printer is not on line!!!":PR
INT@32*12,"turn printer on at th
is time!!!":FORXX=1TO1000:NEXT X
X:GOTO6010
6020 CLS:PRINT@32*5,"2)LINE UP S
HEET IN PRINTER WITH  PRINT HEAD
 AT THIS TIME":SOUND 230,2
6030 PRINT@32*10,"   PRESS ANY K
EY TO CONTINUE":EXEC44539
6040 PLAY"O3;V31;L10;A;V16;A;V8;
A;V3;A;V1;L20;A"
6050 RETURN
```

SPECIAL EVENT!

COCO GALLERY LIVE
SHOWCASE YOUR BEST AT RAINBOWFEST

We are taking the popular "CoCo Gallery" on the road to RAINBOWfest Princeton — and we'd like you t submit your own graphics creations to be exhibited at the show!

RULES

- You can enter color or black-and-white photographs or printouts of your original artwork produced on the CoCo 1, 2 or 3. Entries must be framed, mounted or matted, and may not be smaller than 5-by-7 inches or larger than 11-by-14 inches.
- Don't send us anything owned by someone else; this means no game screens, digitized images from TV programs or material that's already been submitted elsewhere. A digitized copy of a picture that appears in a book or magazine is ***not*** an original work.
- Along with your entry, send a cover letter with your name, address and phone number, detailing how you created your picture (what programs you used, etc.). Please include a few facts about yourself, too!
- Your name, address and phone number, along with the title of your work, must be clearly marked on the back of each entry, and a disk copy of each piece must also be included.
- Entries must be mailed to THE RAINBOW before October 10, 1988, or brought to the RAINBOWfest registration booth by 10 a.m., Saturday, October 22.
- All entries to CoCo Gallery Live become the property of Falsoft, Inc.

There will be two categories: one for graphics produced on the CoCo 1 and 2, and one for CoCo 3 graphics. Several awards will be made in each category. Winners will be determined by votes from RAINBOWfest attendees. In case of any ties, winners will be determined by our chief judge, CoCo Cat.

Prizes and ribbons will be presented Sunday, October 23, 1988, and winning entries will be published in the January '89 issue of THE RAINBOW. Send your entry to "CoCo Gallery Live," THE RAINBOW, 9509 U.S. Highway 42, Prospect, KY 40059.

RAINBOW
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®
PRINCETON
OCT. 21-23

RAINBOWfest is the only computer show dedicated exclusively to your Tandy Color Computer.

Nowhere else will you see as many CoCo-related products or be able to attend free seminars conducted by the top Color Computer experts. It's like receiving the latest issue of THE RAINBOW in your mailbox!

RAINBOWfest is a **great opportunity** for commercial programmers **to show off new and innovative products for the first time. Princeton is the show** to get information on capabilities for the new CoCo 3, along with a terrific selection of the latest CoCo 3 software. In exhibit after exhibit, there will be demonstrations, opportunities to experiment with software and hardware, and special RAINBOWfest prices.

Set your own pace between visiting exhibits and attending the valuable, free seminars on all aspects of your CoCo — from improving BASIC skills to working with the sophisticated OS-9 operating system.

Many people who write for THE RAINBOW — as well as those who are written about — are there to meet you and answer questions. You'll also meet lots of other people who share your interest in the Color Computer. It's a person-to-person event and a tremendous learning experience in a fun and relaxed atmosphere.

A special feature of RAINBOWfest is the **Educational Sandbox**, which features **child-oriented workshops** to give hands-on experience to an age group often neglected. There are sessions for the kindergarten through third-graders, and for fourth- through seventh-graders. And, as an additional treat for CoCo Kids of all ages, we've invited frisky feline CoCo Cat to join us for the show. RAINBOWfest has something for everyone in the family!

If you missed the fun at our last RAINBOWfest in Chicago, why don't you make plans now to join us in Princeton? For members of the family who don't share your affinity for CoCo, there are many other attractions in the Princeton area.

The Hyatt Regency Princeton offers special rates for RAINBOWfest. **The show opens Friday evening** with a session from 7 p.m. to 10 p.m. It's a daytime show Saturday — the CoCo Community Breakfast (separate tickets required) is at 8 a.m., then the exhibit hall opens promptly at 10 a.m. and runs until 6 p.m. On Sunday, the exhibit hall opens at 11 a.m. and closes at 3 p.m.

Tickets for RAINBOWfest may be obtained directly from THE RAINBOW. We'll also send you a reservation form so you can get a special room rate.

The POSH way to go. You can have your travel arrangements and hotel reservations handled through RAINBOW affiliate, POSH Travel Assistance, Inc., of Louisville. For the same POSH treatment many of our exhibitors enjoy, call POSH at (502) 893-3311. All POSH services are available at no charge to RAINBOWfest attendees.

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COCO COMMUNITY BREAKFAST

Dick White — RAINBOW Contributing Editor

Our keynote speaker for the traditional CoCo Community Breakfast is Dick White, contributing editor for THE RAINBOW. Mr. White, who has a long background with microcomputers, will discuss his personal experiences in the early years as he traces the development of the Color Computer since its introduction in 1980.

SPECIAL EVENT!

We're pleased to present The Educational Sandbox, a joint Tandy/RAINBOW effort. This is a computer workshop for RAINBOWfest kids. There will be two sessions on both Saturday and Sunday. One workshop will be for the kindergarten through third-grade set, and the other for fourth- through seventh-graders. Each workshop will last between 45 minutes and one hour, and will give the children and their parents hands-on experience in using Tandy computers and software.

RAINBOWfest - Princeton, New Jersey
Dates: October 21-23, 1988
Hotel: Hyatt Regency Princeton
Rooms: $88 per night, single or double
Advance Ticket Deadline: Oct. 7, 1988

RAINBOWfest - Chicago, Illinois
Dates: April 14-16, 1989
Hotel: Hyatt Regency Woodfield
Rooms: $66 per night, single or double
Advance Ticket Deadline: March 31, 1989

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____ One-day ticket(s) at $7 each total ______
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____ Saturday CoCo Breakfast at $12 each total ______
____ RAINBOWfest T-shirt(s) at $6 each total ______
Specify size:
____ S ____ M ____ L ____ XL
(T-shirts must be picked up at the door)
Handling Charge $1 ______
TOTAL ENCLOSED ______
(U.S. Currency Only, Please)

☐ Also send me a hotel reservation card for the Hyatt Regency Princeton ($88, single or double room).

Name ____________________
(please print)
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Signature ____________________

Advance ticket deadline: October 7, 1988. Orders received less than two weeks prior to show opening will be held for you at the door. Tickets will also be available at the door at a slightly higher price. Tickets will be mailed six weeks prior to show. Children 4 and under, free; over 4, full price.

Make checks payable to: The RAINBOW. Mail to: RAINBOWfest, The Falsoft Building, 9509 U.S. Highway 42, P.O. Box 385, Prospect, KY 40059. To make reservations by phone, in Kentucky call (502) 228-4492, or outside Kentucky call (800) 847-0309.

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Reward your students with an arcade game each time they correctly answer one of these problems

Long Division Drill

By Richard D. Gordley

Computer drill as an educational tool has received a bad reputation as an "animated workbook." Such criticism is frequently warranted, especially when, as in workbooks, the student receives feedback only when the exercise is finished. At the Chillicothe Alternative School, our experience with teaching elementary mathematics had proved that computer-monitored drill can be very useful in the learning of new concepts of calculation if every step of the process is prompted, monitored and evaluated.

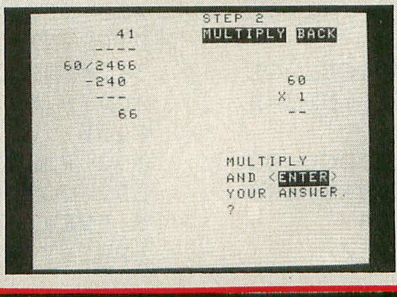
Long Division demonstrates these concepts along with several programming techniques of manipulating figures and prompts on the text screen.

Type in or load the program and run. After the title screen the program tells the student to follow the screen instructions *exactly.* This prompt has proved necessary because young students tend to react to a CRT by staring passively or asking an adult, "What do I do now?"

Richard Gordley and his wife, Nancy, operate the Chillicothe Alternative School in Chillicothe, Ill. Richard has a degree in Music Education, and his hobbies include leathercraft, computing and wind instrument repair.

Figure 1

Lines	Functions
51	Strings of `CHR$(143)` are set up to erase small screen areas.
60	Selects length of division.
95	Puts problem on screen.
100-191	Select location for first digit of quotient and evaluate. Lines 140 through 150 move the question mark.
240-310	Multiplication subroutine in separate work area.
350	Sets up subtraction problem.
460	Checks to see if trial quotient was too large.
480-530	Subtraction routine.
560-570	Flash arrow to show student what part of problem is being worked on.
720-730	Is the problem done?



```
                      STEP 2
        41            MULTIPLY BACK
      ----
   60/2466
     -240                    60
      ---                   X 1
        66                   --



                          MULTIPLY
                          AND <ENTER>
                          YOUR ANSWER.
                          ?
```

Subroutines	Function
1000	Press any key to continue.
1050	Gets divisor and dividend and correct location of first digit of quotient.
1150	Erases prompt area.
1200	Erases bottom of screen.
1210	Erases work area.
1220	Trial quotient too large?
1250	Subtraction error.
1300	Remainder larger than divisor.
1350	Brings down next digit of dividend.
1450	Prompts and gets answer for multiplication.
1460	Prompts to subtract.
1500	Gets value of current quotient.
1550	Prompts for remainder of the subtraction step.
1570	Gets length of answer to the previous subtraction step.
1580	Calculates location of subtraction answer.
1999	Remnant of defunct error trap
2000	Division done — bring down remainder — play tune — pink screen.
2050	Do another?

They seem to need a brief reminder to read the instructions on the screen.

The user next selects the number of digits to be in the divisor. The drill then begins with every step prompted. Flashing prompts, questions marks and arrows show the student exactly what stage of the problem he or she is working on. Separate work areas are provided on the screen for the main problem and for subordinate problem steps. Each step of the long division process is evaluated as it is done, and a *specific* message helps correct any errors. Any step done incorrectly is immediately corrected by the student, so that the final result is always a correctly completed problem. In one special case — that of selecting a trial quotient — an error is allowed to ride until subsequent multiplication is done, so that the student may see the consequence of an erroneous choice.

Program Outline

The location of some of the more interesting routines are indicated in Figure 1. It was quite difficult to enable the program to properly locate the digits of each problem step and evaluate the intermediate answers as well as locate the proper digits on the screen. No wonder long division is tough — there's a lot going on!

Program Enhancements

It takes a long time to do a long division problem this way, but you always get the right answer. As a reward for their perseverance, our students get to play a bit of an arcade-style game after each completed problem. A `GOSUB` at Line 2045 sends the student to this game, which begins at Line 3000. Any short favorite game could be included here.

The correct answer prompts could be more imaginative and encouraging, but they can't be selected from a random string bank because of the necessity of flashing the message. Certainly I would like more variety in the little tune played when a step is completed correctly, but the students don't seem to mind.

Some teachers may feel the need to keep a record of the problems each student completes although we just tell our students how many digits to use in the divisor and how many problems to complete. However, information of this kind could be easily sent to a printer.

It should be noted that *Long Division* contains a multiplication and subtraction routine that could be enhanced and made to stand alone.

(Questions or comments concerning this program may be directed to the author at P.O. Box 28, Castleton, IL 61426 Please enclosed an SASE when requesting a reply.) □

100	19	840	157
180	31	1050	50
280	238	1220	239
430	150	1360	2
550	209	1580	104
690	27	END	170

The listing: DIVISION

```
1 'LONG DIVISION DRILL
2 'COPYRIGHT RICHARD D. GORDLEY
3 'BOX 28, CASTLETON, IL 61426
4 ' SEPT. 24, 1985
10 CLS0:PRINT@96,"chillicothe";:
PRINT@108,"alternative";:PRINT@1
20,"school";:PRINT@172,"presents
";:PRINT@235,"dynamic";
14 CLEAR500
20 PRINT@301,"daily";:PRINT@367,
"drills";:PRINT@425,"long";:PRIN
T@430,"division";
25 XX=RND(-TIMER)
30 FORX=1TO2500:NEXT
40 CLS:PRINT"PLEASE FOLLOW INSTR
UCTIONS ON   THE SCREEN exactly
TO ENJOY     THIS DRILL!":GOSUB1
000
50 CLS:PRINT"HOW MANY DIGITS DO
YOU WISH IN  THE DIVISOR?  <1-3>
"
51 QL=37:RT$="V15O3L4T5GO4CEL2GL
4EL2G":NU$=STRING$(14,143):NL$=S
TRING$(31,143)
52 WR$="V31O1T255CDCDCDCDCDCDCDC
DCDCDCDCDCD":WR$=WR$+WR$+WR$+WR$
60 A$=INKEY$:IFA$=""THEN60
70 IFA$<"1" ORA$>"3" THEN50
80 GOSUB1050
95 CLS:PRINT@70,STRING$(LEN(DI$)
,45);:PRINT@100-LEN(D$),D;:PRINT
@101,"/";:PRINT@102,DI$;
100 PRINT@37,"?          ";
101 QL=37
105 PRINT@16,"STEP 1";:PRINT@48,
"divide";
110 PRINT@306,"WHERE WILL";:PRIN
T@338,"FIRST DIGIT";:PRINT@370,"
OF QUOTIENT";:PRINT@402,"GO?";
120 PRINT@448,"USE ARROW KEYS TO
 MOVE THE '?'";:PRINT@480,"PRESS
 <enter> WHEN DONE.";
121 FORX=1TO200:NEXT:PRINT@476,C
HR$(143);:FORX=1TO200:NEXT
122 A$=INKEY$:IFA$=""THEN120
130 PRINT@476,"?"
140 IFA$=CHR$(8) THENQL=QL-1:PRI
NT@QL,"? ";:GOTO122
150 IFA$=CHR$(9) THENPRINT@QL,"
?";:QL=QL+1:GOTO122
160 IFA$<>CHR$(13)THEN120
170 IFQL<PL THENPLAYWR$:GOSUB115
0:PRINT@306,"DIGIT TOO";:PRINT@3
38,"FAR left!";:PRINT@370,"TRY A
GAIN.";:GOSUB1000:GOSUB1150:GOTO
100
180 IFQL>PL THENPLAYWR$:GOSUB115
0:PRINT@306,"DIGIT TOO";:PRINT@3
38,"FAR right!";:PRINT@370,"TRY
AGAIN.";:GOSUB1000:GOSUB1150:GOT
O100
190 PLAYRT$
191 GOSUB1150:FORX=1TO3:PRINT@30
6,"VERY GOOD!";:FORY=1TO200:NEXT
:PRINT@306,"very good";:FORY=1TO
```

```
200:NEXT:NEXT
200 GOSUB1150:GOSUB1000:GOSUB115
0
210 PRINT@QL,CHR$(191);:PRINT@30
6,"NOW press";:PRINT@338,"A NUMB
ER TO";:PRINT@370,"USE AS FIRST"
;:PRINT@402,"DIGIT OF";:PRINT@43
4,"QUOTIENT.";
215 A$=""
220 A$=INKEY$:IFA$="" THEN220
230 A=VAL(A$):IFA<1 ORA>9 THEN22
0
232 PRINT@QL,A$:SOUND100,3
234 ML=153:GOSUB240:GOTO350
240 PRINT@21,"2";:PRINT@48,"mult
iply back";:GOSUB1150
250 PRINT@ML-LEN(D$),D;:PRINT@ML
+30,"X";A;:PRINT@ML+65-LEN(D$),S
TRING$(LEN(D$),45);:PRINT@ML+93,
"    ";
260 GOSUB1450
270 GOSUB1150
275 MA$=STR$(MA)
280 PRINT@ML+97-LEN(MA$),MA;
290 PR=A*D:IFMA<>PR THENPLAYWR$:
FORX=1TO3:PRINT@306,"MULTIPLICAT
ION";:PRINT@338,"ERROR!";:FORY=1
TO300:NEXT:PRINT@306,"multiplica
tion";:PRINT@338,"error";:FORY=1
TO300:NEXT:NEXT:PRINT@402,"TRY A
GAIN";:GOSUB1000:GOTO240
300 PLAYRT$:FORX=1TO3:PRINT@306,
"EXCELLENT!";:FORY=1TO200:NEXT:P
RINT@306,"excellent";:FORY=1TO20
0:NEXT:NEXT
305 GOSUB1150
310 RETURN
350 GOSUB1210
360 GOSUB1570
365 IFQL=38 THENPRINT@133,PR;:PR
INT@166,"-"
370 IFQL=39  ANDLEN(PR$)=1 THENP
RINT@134,PR;:PRINT@166,"--";
380 IFLEN(D$)=1 ANDLEN(PR$)=2 TH
ENPRINT@133,PR;:PRINT@166,"--";
390 IFQL=39 ANDLEN(D$)=2 THENPRI
NT@133,PR;:PRINT@166,"--";
400 IFQL=40  ANDLEN(PR$)=2 THENP
RINT@134,PR;:PRINT@166,"---";
410 IFLEN(D$)=2 ANDLEN(PR$)=3 TH
ENPRINT@133,PR;:PRINT@166,"---";
420 IFQL=40 ANDLEN(PR$)=3 THENPR
INT@133,PR;:PRINT@166,"---"
430 IFQL=41 ANDLEN(PR$)=3 THENPR
440 IFQL=41 AND LEN(PR$)=4 THENP
RINT@133,PR;:PRINT@166,"----";
445 ER=133
450 PRINT@133,"-";:GOSUB1200
460 IFPR>VAL(LEFT$(DI$,QL-37)) T
HENGOSUB1220:GOTO210
470 MN=VAL(LEFT$(DI$,QL-37))
```

```
480 PRINT@21,"3";:PRINT@48,"subt
ract  ";
490 GOSUB1460
495 DF$=STR$(DF):DF$=RIGHT$(DF$,
LEN(DF$)-1)
500 IF DF<>(MN-PR) THENGOSUB1250
:GOTO490
505 PRINT@QL+5*32-LEN(DF$),DF;
510 IFDF=>D THENPRINT@210,CHR$(9
5):GOSUB1300:PRINT@133,"    ";:P
RINT@165,"    ";:PRINT@197,"
";:GOTO210
520 GOSUB1150:PLAYRT$:FORX=1TO3:
PRINT@306,"WELL DONE!";:FORY=1TO
200:NEXT:PRINT@306,"well done";:
FORY=1TO300:NEXT:NEXT:TL=QL:QL=Q
L+1
525 PRINT@QL+5*32-LEN(DF$)-1,DF;
530 BL=96:BD=1024+QL+64:GOSUB135
0
540 PRINT@21,"1";:PRINT@48,"divi
de    ";:
550 GOSUB1550
555 PRINT@QL,CHR$(143);
557 PB=197:PN=203:GOSUB1500
558 MN=CU
560 PRINT@203,CHR$(95);:FORX=1TO
200:NEXT
570 PRINT@203,CHR$(143);:FORX=1T
O200:NEXT
580 A$=INKEY$:IFA$="" THEN560
590 IFA$<"0" OR A$>"9" THEN560
594 A=VAL(A$)
600 PRINT@QL,A$;:SOUND100,3
610 GOSUB240
611 ER=229
618 GOSUB1570
620 PB=197:GOSUB1580
630 PR$="-"+PR$:PRINT@SL-LEN(PR$
),PR$;
640 PRINT@SL+32-LEN(PR$),STRING$
(LEN(PR$),45);
650 IFPR>MN THENGOSUB1220:GOSUB1
210:GOTO540
660 PRINT@21,"3";:PRINT@48,"subt
ract  ";
670 GOSUB1460
680 IFDF<>MN-PR THENGOSUB1250:GO
TO670
690 IFDF=>D THENGOSUB1300:GOSUB1
210:PRINT@229,"    ";:PRINT@26
1,"    ";:GOTO540
700 GOSUB1150:PLAYRT$:FORX=1TO3:
PRINT@306,"RIGHT!";:FORY=1TO200:
NEXT:PRINT@306,"right";:FORY=1TO
200:NEXT:NEXT:TL=QL:QL=QL+1
710 DF$=STR$(DF):DF$=RIGHT$(DF$,
LEN(DF$)-1):PRINT@QL+8*32-LEN(DF
$)-1,DF
720 PB=37:PN=45:GOSUB1500
730 IFCU=INT(DI/D) THEN2000
```

```
735 BL=192:BD=1024+QL+64:GOSUB13
50
740 GOSUB1150:PRINT@21,"1";:PRIN
T@48,"divide       ";
750 GOSUB1550
755 PRINT@QL,CHR$(143);
757 PB=294:PN=301:GOSUB1500
758 MN=CU
760 PRINT@301,CHR$(95);:FORX=1TO
200:NEXT
770 PRINT@301,CHR$(143);:FORX=1T
O200:NEXT
780 A$=INKEY$:IFA$=""THEN760
790 IFA$<"0" ORA$>"9" THEN760
794 A=VAL(A$)
800 PRINT@QL,A$;:SOUND100,3
810 GOSUB240
811 ER=325
818 GOSUB1570
820 PB=294:GOSUB1580
830 PR$="-"+PR$:PRINT@SL-LEN(PR$
),PR$;
840 PRINT@SL+32-LEN(PR$),STRING$
(LEN(PR$),45);
850 IFPR>MN THENGOSUB1220:GOSUB1
210:GOTO740
860 PRINT@21,"3";:PRINT@48,"subt
ract      ";
870 GOSUB1460
880 IFDF<>MN-PR THENGOSUB1250:GO
TO870
890 IFDF=>D THENGOSUB1300:GOSUB1
210:PRINT@326,"          ";:PRINT@35
8,"      ";:GOTO740
900 GOSUB1150:PLAYRT$:FORX=1TO3:
PRINT@306,"CORRECT!";:FORY=1TO20
0:NEXT:PRINT@306,"correct";:FORY
=1TO200:NEXT:NEXT:TL=QL:QL=QL+1
910 DF$=STR$(DF):DF$=RIGHT$(DF$,
LEN(DF$)-1):PRINT@QL+11*32-LEN(D
F$)-1,DF
920 PB=37:PN=45:GOSUB1500
930 IFCU=INT(DI/D) THEN2000
999 END
1000 PRINT@448,"PRESS ANY KEY TO
 CONTINUE";
1005 A$=INKEY$:IFA$=""THEN1005
1010 RETURN
1050 IFA$="1" THEND=RND(9) ELSEI
FA$="2" THEND=RND(89)+10 ELSEIF
A$="3" THEND=RND(899)+100
1060 IFA$="1" THENDI=RND(899)+10
0 ELSEIFA$="2" THENDI=RND(8999)+
1000 ELSEIFA$="3" THENDI=RND(899
99)+10000
1075 D1$=STR$(D):D$=RIGHT$(D1$,L
EN(D1$)-1):D2$=STR$(DI):DI$=RIGH
T$(D2$,LEN(D2$)-1)
1080 DC$=LEFT$(DI$,LEN(D$)):DC=V
AL(DC$)
1090 IFLEN(D$)=1 AND D<=DC THENP
```

```
L=38:RETURN
1095 IF LEN(D$)=1 THENPL=39:RETU
RN
1100 IFLEN(D$)=2 AND D<=DC THENP
L=39:RETURN
1105 IFLEN(D$)=2 THENPL=40:RETUR
N
1110 IFLEN(D$)=3 ANDD<=DC THENPL
=40:RETURN
1115 IFLEN(D$)=3 THENPL=41
1120 RETURN
1150 FORX=306TO434STEP32:PRINT@X
,NU$;:NEXT:PRINT@448,NL$:PRINT@4
80,NL$;:RETURN
1160 RETURN
1200 PRINT@320,STRING$(185,143);
:RETURN
1210 PRINT@149,"          ";:PRINT@1
49+32,"          ";:PRINT@149+64,"
    ";:PRINT@149+96,"          ";:RE
TURN
1220 PLAYWR$:GOSUB1150:FORX=1TO3
:PRINT@448,"TRIAL QUOTIENT TOO L
ARGE          SUBTRACTION IMPOSSIB
LE";:FORY=1TO 500:NEXT:PRINT@448
,"trial quotient too large
  subtraction impossible";:FORY=
1TO500:NEXT:NEXT:GOSUB1150
1230 PRINT@ER,"          ";:PRINT@ER+
32,"      ";:RETURN
1250 PLAYWR$:GOSUB1150:FORX=1TO3
:PRINT@306,"SUBTRACTION";:PRINT@
338,"ERROR!";:FORY=1TO300:NEXT:P
RINT@306,"subtraction";:PRINT@33
8,"error";:FORY=1TO300:NEXT:NEXT
:GOSUB1150:RETURN
1300 GOSUB1150:PLAY WR$:FORX=1TO
5:PRINT@306,"REMAINDER";:PRINT@3
38,"LARGER THAN";:PRINT@370,"DIV
ISOR!";:FORY=1TO400:NEXT
1310 PRINT@306,"remainder";:PRIN
T@338,"larger than";:PRINT@370,"
divisor";:FORY=1TO400:NEXT:NEXT:
GOSUB1150:PRINT@21,"1";:PRINT@48
,"divide      ";:RETURN
1350 PE=PEEK(BD):PRINT@21,"4";:P
RINT@48,"bring down    ";:POKEBD
,PE-64
1360 GOSUB1150:PRINT@306,"USE AR
ROW";:PRINT@338,"TO BRING DOWN";
:PRINT@370,"NEXT NUMBER";:PRINT@
402,"FROM";:PRINT@434,"DIVIDEND.
";
1370 A$=INKEY$:IFA$="" THEN1370
1380 IFA$<>CHR$(10) THEN1370
1390 POKEBD,PE:FORX=1TO3:POKEBD+
BL,PE-64:FORY=1TO100:NEXT:POKEBD
+BL,PE:FORY=1TO100:NEXT:NEXT
1400 RETURN
1450 PRINT@306,"MULTIPLY";:PRINT
@338,"AND <enter>";:PRINT@370,"Y
```

```
OUR ANSWER.";:PRINT@402,"";:INPU
TMA:RETURN
1460 PRINT@306,"SUBTRACT";:PRINT
@338,"AND <enter>";:PRINT@370,"Y
OUR ANSWER.";:PRINT@402,"";:INPU
TDF:RETURN
1500 CU$="":FORX=1024+PB TO 1024
+PN
1510 IFPEEK(X)>111 ANDPEEK(X)<12
2 THENCU$=CU$+CHR$(PEEK(X)-64)
1520 NEXT
1530 CU=VAL(CU$)
1540 RETURN
1550 GOSUB1150:PRINT@306,"NOW DI
VIDE";:PRINT@338,"THIS NUMBER";:
PRINT@370,"BY DIVISOR";:PRINT@40
2,"AND press";:PRINT@434,"ANSWER
.";
1560 RETURN
1570 PR$=STR$(PR):PR$=RIGHT$(PR$
,LEN(PR$)-1):RETURN
1580 PB=PB+1024
1590 PP=PEEK(PB):IFPP<112 ORPP>1
21THENPB=PB+1:GOTO1590
1600 PP=PEEK(PB):IFPP>111 ANDPP<
122 THENPB=PB+1:GOTO1600
1610 SL=PB-1024+32
1620 RETURN
1999 CLS:DF=1
2000 GOSUB1150:IFDF<>0 THENPRINT
@306,"DIVISION DONE.";:PRINT@338
,"PRESS <enter>";:PRINT@370,"TO
BRING UP";:PRINT@402,"REMAINDER.
";:SOUND150,1:A$=INKEY$:IFA$<>CH
R$(13)THEN2000 ELSEPRINT@44,"R";
DF;
2010 PRINT@16,STRING$(10,32);:PR
INT@48,STRING$(10,32);:FORX=128T
O448 STEP32:PRINT@X,STRING$(32,3
2);:NEXT
2020 PRINT@0," problem successfu
lly completed!";
2030 POKE65314,9
2040 PLAY"T2V15L6O4CL16DCO3A#L8A
AAGFGL4AL8FO4L6CL16DCO3A#L8AA#AG
FGL3F"
2045 'PUT A "GOSUB" HERE TO SEND
 STUDENT TO A GAME ROUTINE USED
 AS A REWARD
2050 PRINT:PRINT"WOULD YOU LIKE
TO DO ANOTHER    PROBLEM (Y/N)?"
2060 A$=INKEY$:IFA$="" THEN2060
2070 IFA$<>"Y" ANDA$<>"N" THEN20
60
2080 IFA$="Y" THENRUN50
2090 PRINT:PRINT"LONG DIVISION D
RILL COMPLETED."
2100 END
```

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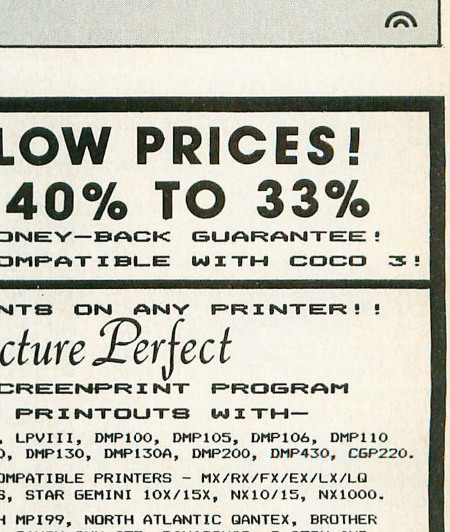

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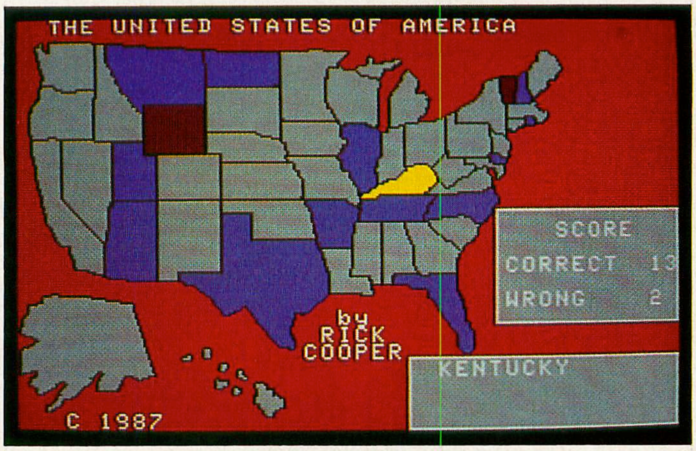
Help students remember their geography lessons by using this challenging game as a study tool

* * *



States and Capitals

★ By Rick Cooper ★

Teaching students the names of the states and their capitals can be a struggle. Your students balk at memorizing the names and capitals of 50 (gasp!) states, and you can't think of any way to make the task any less dismal. Worse, once your students have completed the test or quiz on this information, it's gone. Few students will feel any need to remember the names of states and capitals that are far away. Even if they wanted to remember the lesson, when will they use those names? How will they retain this information?

* * *

Rick Cooper, a principal, teacher and coach, enjoys writing programs more than using them. Although many of his programs are used by his teachers and students, Rick's best critics are his wife, Donna, and daughters, Kristin and Kasey.

US States is a great way to teach students the states and the capitals of the United States, or for anyone to brush up on geography skills. The program begins by drawing a map of the United States — including Alaska and Hawaii. It then asks you to choose between naming states or capitals. Once you have indicated your choice, the program asks that you choose the hard or easy version. The map shown in the harder version is a darker color than the map in the easy one. This makes it more difficult to use the adjoining states as reference points when identifying the individual states.

When you are playing *US States*, the states will be illuminated one by one. You must identify either the state or the capital, correctly type its name and press ENTER. If you are correct, the state will become light blue. If you have made a mistake, the correct name and spelling will appear and the state will turn brown. Press any key to move to the next state.

US States runs on the CoCo 3 and uses 128K. If you do not have an RGB monitor, you may want to modify six lines of the program. Put REMs in lines 70, 90 and 410, and delete the REMs from lines 80, 100 and 400. This will make the program readable on your screen. You may also wish to use different colors for better results.

US States makes learning the states and their capitals fun. As a game, the program gives students a reason to remember the information long after they have completed the assignment and passed the test. As a study guide, *US States* helps you make an important lesson come to life.

(Questions or comments about the program may be directed to the author at P.O. Box 276, Liberty, KY 42539. Please include an SASE when requesting a reply.)

280	58	1200	21
500	117	1250	253
660	110	1320	239
870	139	1360	158
990	88	END	24
1030	62		

The listing: STATES

```
10 ON ERR GOTO 1520
20 ON BRK GOTO 1520
30 POKE &HE6E4,&HE7
40 GOSUB 1150
50 POKE &HFFD9,0
60 HCOLOR 1,0
70 DATA 63,0,54,36,1,15,62,32
80 REM DATA 7,0,63,52,0,27,48,23
90 P2=54
100 REM P2=63
110 DIM PN$(50),PC$(50),UD(50),S
L(50,2),CP$(50)
120 FOR X=1 TO 50
130 READ PN$(X),PC$(X)
140 NEXT X
150 FOR X=1 TO 50
160 READ SL(X,1),SL(X,2)
170 NEXT X
180 HCOLOR 0,1
190 HLINE(228,90)-(319,142),PSET
,B
200 HCOLOR 4,1
210 HLINE(229,91)-(318,141),PSET
,BF
220 HCOLOR 0,1
230 HPRINT(29,12),"CHOOSE ONE"
240 HPRINT(29,14),"1) STATES"
250 HPRINT(29,16),"2) CAPITALS"
260 I$=INKEY$:IF I$="" THEN 260
270 IF I$<"1" OR I$>"2" THEN 260
280 IF I$="1" THEN FOR X=1 TO 50
:CP$(X)=PN$(X):NEXTX
290 IF I$="2" THEN FOR X=1 TO 50
:CP$(X)=PC$(X):NEXTX
300 HCOLOR 0,1
310 HLINE(228,90)-(319,142),PSET
,B
320 HCOLOR 4,1
330 HLINE(229,91)-(318,141),PSET
,BF
340 HCOLOR 0,1
350 HPRINT(29,12),"CHOOSE ONE"
360 HPRINT(29,14),"1) EASIER"
370 HPRINT(29,16),"2) HARDER"
380 I$=INKEY$:IF I$="" THEN 380
390 IF I$<"1" OR I$>"2" THEN 380
400 IF I$="1" THEN DF=56 ELSE DF
=1
410 REM IF I$="1" THEN DF=32 ELS
E DF=0
420 PALETTE 4,DF
430 HCOLOR 1,0
440 TIMER=RND(-0)
450 SS=0:BC=0
460 GOSUB 670
470 FOR X=1 TO50:UD(X)=0:NEXT X
480 IF BC=50 THEN 1040
490 R=RND(50)
500 IF UD(R)<>0 THEN 490
510 UD(R)=1
520 BC=BC+1
530 HPAINT(SL(R,1),SL(R,2)),2,1
540 IF R=11 THEN HPAINT(91,155),
2,1:HPAINT(99,162),2,1:HPAINT(98
,170),2,1:HPAINT(107,165),2,1:HP
AINT(105,173),2,1:HPAINT(120,177
),2,1
550 IF R=35 THEN HPAINT(184,40),
2,1
560 K=5
570 GOSUB 790
580 IF R$=CP$(R) THEN SS=SS+1:K=
5:HCOLOR 0,1:HPRINT(28,22),"CORR
ECT!":HCOLOR 1,0
590 IF R$<>CP$(R) THEN K=7:HCOLO
R 6,1:HPRINT(25,22),CP$(R):HCOLO
R 1,0
600 IF R$<>CP$(R) AND INKEY$=""
THEN 600
610 IF R$=CP$(R) THEN FOR X=0 TO
 63:PALETTE 2,X:NEXT X:PALETTE 2
,P2
620 HPAINT(SL(R,1),SL(R,2)),K,1
630 IF R=11 THEN HPAINT(91,155),
K,1:HPAINT(99,162),K,1:HPAINT(98
,170),K,1:HPAINT(107,165),K,1:HP
AINT(105,173),K,1:HPAINT(120,177
),K,1
640 IF R=35 THEN HPAINT(184,40),
K,1
650 GOSUB 670
660 GOTO 480
670 HCOLOR 0,1
680 HLINE(228,90)-(319,142),PSET
,B
690 HCOLOR 4,1
700 HLINE(229,91)-(318,141),PSET
,BF
710 HCOLOR 0,1
720 HPRINT(32,12),"SCORE"
730 S1$="CORRECT "+STR$(SS)
740 HPRINT(29,14),S1$
750 S2$="WRONG   "+STR$(BC-SS)
```

```
760 HPRINT(29,16),S2$
770 HCOLOR 1,0
780 RETURN
790 REM GET INPUT
800 HCOLOR 0,1:HLINE(186,158)-(3
19,191),PSET,B
810 R$=""
820 HCOLOR 4,1:HLINE(187,159)-(3
18,190),PSET,BF
830 HCOLOR 0,1
840 I$=INKEY$:IF I$="" THEN 840
850 IF I$=CHR$(13) THEN HCOLOR 1
,0:RETURN
860 IF I$=CHR$(8) AND LEN(R$)<=1
 THEN 790
870 IF I$=CHR$(8) THEN HCOLOR 4,
1:HPRINT(25,20),R$:R$=LEFT$(R$,L
EN(R$)-1):HCOLOR 0,1:HPRINT(25,2
0),R$:GOTO 840
880 R$=R$+I$
890 HPRINT(25,20),R$
900 GOTO 840
910 FOR X=1 TO 50
920 HPAINT(SL(X,1),SL(X,2)),4,1
930 IF X=11 THEN HPAINT(91,155),
4,1:HPAINT(99,162),4,1:HPAINT(98
,170),4,1:HPAINT(107,165),4,1:HP
AINT(105,173),4,1:HPAINT(120,177
),4,1
940 IF X=35 THEN HPAINT(184,40),
4,1
950 NEXT X
960 RETURN
970 DATA WASHINGTON,OLYMPIA,OREG
ON,SALEM,CALIFORNIA,SACRAMENTO,N
EVADA,CARSON CITY,IDAHO,BOISE,UT
AH,SALT LAKE CITY,ARIZONA,PHOENI
X,NEW MEXICO,SANTA FE,TEXAS,AUST
IN,ALASKA,JUNEAU,HAWAII,HONOLULU
,OKLAHOMA,OKLAHOMA CITY,KANSAS,T
OPEKA
980 DATA COLORADO,DENVER,WYOMING
,CHEYENNE,MONTANA,HELENA,NORTH D
AKOTA,BISMARCK,SOUTH DAKOTA,PIER
RE,NEBRASKA,LINCOLN,MINNESOTA,"S
T. PAUL",IOWA,DES MOINES,MISSOUR
I,JEFFERSON CITY,ARKANSAS,LITTLE
 ROCK,LOUISIANA,BATON ROUGE,MISS
ISSIPPI,JACKSON
990 DATA ALABAMA,MONTGOMERY,GEOR
GIA,ATLANTA,FLORIDA,TALLAHASSEE,
SOUTH CAROLINA,COLUMBIA,NORTH CA
ROLINA,RALEIGH,TENNESSEE,NASHVIL
LE,KENTUCKY,FRANKFORT,ILLINOIS,S
PRINGFIELD,WISCONSIN,MADISON,MIC
HIGAN,LANSING,INDIANA,INDIANAPOL
IS
1000 DATA OHIO,COLUMBUS,PENNSYLV
ANIA,HARRISBURG,WEST VIRGINIA,CH
ARLESTON,VIRGINIA,RICHMOND,MARYL
AND,ANNAPOLIS,DELAWARE,DOVER,NEW
 JERSEY,TRENTON,NEW YORK,ALBANY,
CONNECTICUT,HARTFORD,RHODE ISLAN
D,PROVIDENCE
1010 DATA MASSACHUSETTS,BOSTON,V
ERMONT,MONTPELIER,NEW HAMPSHIRE,
CONCORD,MAINE,AUGUSTA
1020 DATA 25,24,25,41,17,68,26,7
4,42,54,55,79,55,93,73,93,110,11
8,40,146,82,158,122,97,122,77,85
,77,75,51,75,29,108,24,108,44,10
8,60,135,38,135,54,143,76,147,95
,151,114,165,114,180,114,194,114
,201,126
1030 DATA 207,99,207,90,185,90,1
88,81,165,62,165,39,169,26,179,5
7,192,57,208,57,208,70,214,78,22
0,68,229,67,230,62,230,49,236,51
,244,49,244,45,235,37,240,37,248
,28
1040 HCOLOR 0,1
1050 HLINE(186,158)-(319,191),PS
ET,B
1060 HCOLOR 4,1
1070 HLINE(187,159)-(318,190),PS
ET,BF
1080 HCOLOR 6,1
1090 HPRINT(25,20),"YOUR SCORE I
S "
1100 HPRINT (29,21),STR$(SS*2)+"
%"
1110 HPRINT(25,22), "TRY AGAIN?
Y/N"
1120 I$=INKEY$:IF I$="" THEN 112
0
1130 IF I$="Y" THEN GOSUB 910:GO
TO 180
1140 GOTO 1520
1150 REM DRAW US MAP
1160 FOR X=0 TO 7:READ SC:PALETT
E X,SC:NEXT X
1170 HCOLOR 1,3
1180 HSCREEN2
1190 HDRAW"BM9,13;D3R1D4R1D4R1D3
R1D2L1D4L1D5L1D1L1D1G2D2L1D11R1D
10R1D4R1D7R1D4R1D3R1D5R1D3R1D4F3
D1F1D1F1D1F3R4D4R1D2R1D4R1D1R6D1
R3D1R4D1R3D1R9D1R26D1R1D1R4F3R1F
2R1F2"
1200 HDRAW"D1F4D1F1R3U1R2U1R2E2R
1F3D1F2D1F5D1F6R4D1R2E1U4L1U2L1U
4R1U3R1U3R3D1R1U1R2E5R1E4R15D1R5
E1U2L1U2R17F2R7F1D3R1F3D1F1D1F2D
1F3D1F4D6F3R3E2U8H2U2H1L1U6L1"
1210 HDRAW"U4L1U2L1U2L1U15R1U2E2
U1E2R1E1R1U1E2U3E3R1U1E3U2E2R1U3
H2U3L1U4H2U1E1R2D2R1D3R1E3U4E1U1
E2G1U3E1U3H2U4R2D1R2E2R2U1R5E1R3
E3U2H1G1H2F1L1H2E1"
1220 HDRAW"H2F1L2U1E1R1E3R1E3G1U
2E1R2E2G1U1E3U1H1U1H1U1H2L1H2L3G
2D3L1G2D1G2L2G2L9G1L2G1L2G2D2G1D
```

```
1G4L1G1L1G1L1G2L1G1L1G1L1G1L1G1L
2G1L7H1E1R1E2U2R1U4R1L2"
1230 HDRAW"R1U1H2U1L1D1L3U2R1U4H
5L1D1G2D2G2D1G3D1G1D14L1D2L3H2U1
R1U17E1U2H1E2U1E1U1R4U1R1U1R2U1R
1U1H1L3D1L5D1L4U2H2D1L1D3G1L3G2L
5H3E5U1L11H1L6G1L42H1L14H1L17H1L
10H1L14H1L17H1D1L3D5L1H2U2H1G1D1
L2"
1240 HPAINT(100,100),4,1
1250 HDRAW"BM39,12;D22L9G1L6H1L2
H2L5BM39,34;D4L1D19L18H1L3G1L7BM
22,58;D26F21D14U15E1U4E1U10R1U2E
1R109F2R1F1R1E1R1U5D3R7E2R37E1R1
1E1R1E1R3"
1260 HDRAW"BM220,96;L2H3L2H1L2G1
L7G1L5G1F1D1F4R1F3R2F4BM209,119;
L13G1L3H1L12D1L1D3BM173,123;U28L
11U4E1U1L1U1BM199,83;D1G2D1L1G1D
3L1G1D3R2L21R10D3F1D2F1D1F1D1F1D
9F1D1F1D1"
1270 HDRAW"BM168,123;U1L1U2L9U3E
1U15E1U4E1BM158,107;L14D1F1D3R1D
3F1D2R1D9BM143,107;U2L1U5L1U4H1U
4H1U1H2U2L2U1R1U8H2U2L1H1U2H1L33
D23R14D12R30"
1280 HDRAW"BM78,121;U3R20U54L36U
6L23R8D29U1BM61,85;R14BM68,122;U
58BM62,57;U16R29D23U42H1U6BM44,1
2;D9F1D1F2D2F2D2F2D2F1R1F2D1F2D1
R1F1D1R1F1"
1290 HDRAW"BM91,54;R23F1R1F1R4F1
R3F2R1D3F1D2L1D1F1D1BM129,65;R23
D1R1D1R1D4R1D1R2F1D2F2D1F2D3BM15
3,64;E1U1R1U2R1E1U1H1L1H1U5H1U1H
2U1H1U1H1L1U2H1U11R1U4E1R4U1"
1300 HDRAW"BM126,16;D16L3D1L31R3
4D24U9R1D1R25F2R2U1R10D1R2D1R3F2
D11G2D3L1D3R1D6L1D1L2D1L1D1L3D1B
M172,78;R2U1R2U1R4E4R1U2L1U19L2G
1L4G2L1BM185,50;R5E1R8E1R2E1"
1310 HDRAW"BM204,47;D17E1G8H2L6G
1L2G1D1L1G1BM194,83U1R1E1U1R1E3R
1H1U1H1U1H2BM200,75;F1D1F3R1E1R1
E3R1E1R2E3R1U2H1L4U3L8U2BM214,66
;R11D2R1F1R5"
1320 HDRAW"BM225,71;L1H1L1G1L2BM
224,65E1R4F2R2BM226,64;U7H1U5H1L
15U5BM225,52;F3R3F2BM233,53;U5R9
D3U4R4D1R1D2BM233,48U7L1H1U3H1U8
BM238,28;D7G1D5L5R12E1BM246,38;L
1U1H1U1H1U8"
1330 HDRAW"BM127,177;D4L2G1L1D1L
1D2L3H2U1H1L1U2L2U4R1U3H1U1E1R3F
1R1D2R3D3U1R1F2R1F1BM107,172;D2L
1G1L1H1U2E1R1F1BM108,168;R1E1H2U
1H1L1G1D2F1R1F1"
1340 HDRAW"BM101,168;D2G1L1G1L2H
1U3E1F1R3BM99,164;L1H1L1E1U1E1R2
F1D1G2BM93,157;U3H1L2G1D3F1R2E1B
M84,157;D1G1L3H1E1R1E1R1F1BM67,1
66;U1H1U2H1U2H1U2H1U2H1U3H1U2H1U
2H1U2H1U2H1U3H1L5H1L6H1L6H1L15H1
L3G1L3G1D2L2G1L4D4G3D3G1D2F1R1F1
R3F1R1F1"
1350 HDRAW"L1G2L1G1L2G2D11R1E1R3
E1R2D2L1D1L2D2L1D1F1R1F1R1D2F1R2
E1R1E1R1E1R1E1U1R1E1R2F1G4F1L1G1
D1G3L2D3R3U1R1E1R1E2U1E1R3E1R1E5
R1E3H1F1U1E3R1F1G2D1G1D4R10U1R1U
2R1U2E2R3F1R1F1R1E1R2E1R2"
1360 HDRAW"BM172,30;H1L3H1L3H3"
1370 HPAINT(60,160),4,1
1380 HPAINT(91,155),4,1
1390 HPAINT(99,162),4,1
1400 HPAINT(98,170),4,1
1410 HPAINT(107,165),4,1
1420 HPAINT(105,173),4,1
1430 HPAINT(120,177),4,1
1440 HPAINT(82,158),4,1
1450 HCOLOR 0,1
1460 HPRINT (2,0),"THE UNITED ST
ATES OF AMERICA"
1470 HPRINT (19,17),"by"
1480 HPRINT (18,18),"RICK"
1490 HPRINT (17,19),"COOPER"
1500 HPRINT (3,23),"C 1987"
1510 RETURN
1520 POKE &HFFD8,0
1530 END
```

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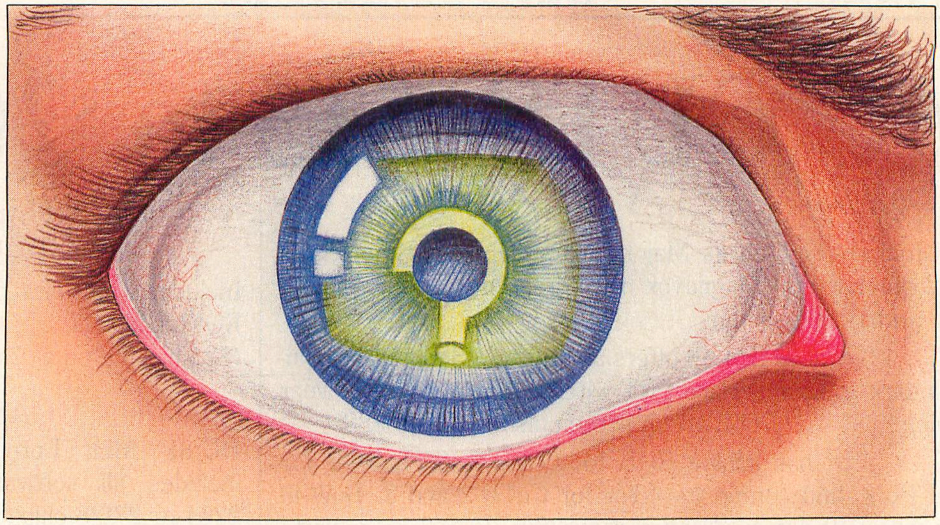
Gather up to five of your friends around the computer for a game of one-word Charades

Clue Me In!



By James and Mary Jean Lamonica

Clueword is a talking word game for up to six players. You are given four cluewords, one at a time, and asked to guess what they have in common or what they describe. After each clueword, the computer waits for you to enter an answer. Type in your answer and press ENTER. If you have no guess, just press ENTER. If you are wrong, the computer will give you the next clueword in the set. If you are correct, the computer will go on to the next set of cluewords. The fewer cluewords you use, the more points you will get.

The cluewords and the answers are saved by a separate program called *Cluefile*. When you enter your answers, follow these five simple rules:

1) The answer should be singular and not plural.
2) When the answer is a name, use the last name only.
3) When the answer is a set of initials, put periods between them.
4) When the answers are numbers, enter them numerically.
5) The answer must match exactly; so spelling counts!

The programs can be used without the Speech/Sound Pak and can be converted to use with a tape system.

How *Cluefile* Works

To see how the game works, let's begin with the *Cluefile* program. This program is used to enter up to 300 sets of four cluewords and an answer. Lines 1 through 20 are the introduction. Lines 30 through 70 ask if you want to load a partially completed set file. The program allows you to add to an existing set file so that you don't have to enter all 300 sets at a time. If you answer 'Y' to that question, the computer will go to the subroutine at Line 500. Lines 500 through 550 enter the partial file, and Line 540 inputs the data into an array called `D$`. The `DS=X` statement counts the number of sets already in the file so that the computer can tell you how many can be added.

Lines 90 through 100 give you instructions. Line 95 was added to allow you to make copies of the file. To do this, enter zero when asked how many sets you want to enter; then put in a different, initialized disk in the drive. The computer will go to the `SAVE` routine at Line 180.

Lines 110 through 160 contain the loop to enter the clueword sets. When prompted by the computer, enter each of the four cluewords, one at a time. Press ENTER after entering each clueword. If you notice an error after you have pressed ENTER, you may use the up arrow key to go back to the previous clueword. Before you press ENTER for the fourth clueword, go back over all four to double-check them. The `PRINT @` statement in Line 130 keeps the cluewords in order on the screen, even if you go back one to make a correction. Line 132 allows you to make the correction, and Line 150 inputs the answer to the cluewords.

Lines 180 through 220 save the clueword file on disk as *Cluedata*. A 300-set file will use about seven granules, so be sure the disk has room.

To get you started with your own sets of cluewords, here are four examples:

Chicago	Cubs
National	
League	
Baseball	

Jim and Mary Lamonica are both proud to be teachers in the El Paso, Texas, school system. They have had two previous programs published in THE RAINBOW.

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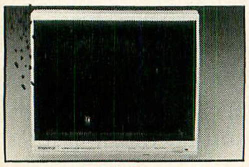
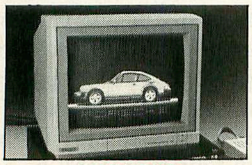
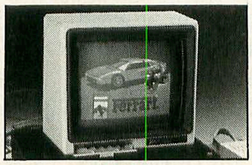


7622



8CM515



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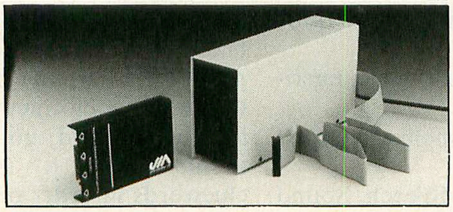

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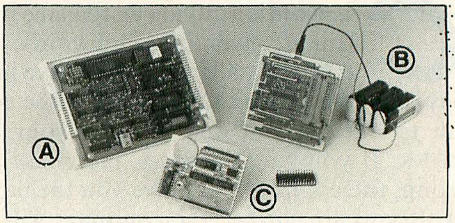

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How *Clueword* Works

Lines 1 through 20 are the introduction, and lines 21 through 70 load the *Cluedata* file into the game. Lines 80 through 220 contain the basic game loop. Lines 80 and 90 allow you to enter the names of up to six players; these names should be limited to 12 characters for proper placement. Line 95 begins the game loop, and Line 100 prints the players' names at the top of the screen with their scores and an arrow pointing to the name of the player whose turn it is. Line 110 chooses a set number randomly and tests to see if the set has been used. If it has, another set is chosen. The used set numbers are stored in array `DU`.

Line 120 presents the cluewords both on the screen and vocally. If you do not have the Speech/Sound Pak, delete lines 500 through 507 and all `GOSUB 500` statements. The cluewords are centered by dividing the length of the clueword in half and subtracting that amount from the center point of the line.

Line 130 determines the point value for each clueword. If you guess correctly on the first clueword, you get 16 points; on the second, 8; on the third, 4; and on the fourth, 2. Line 140 allows you to input your answer. Line 145 allows you to quit the game at any time by entering a 'Q' for a clueword answer. If you enter the correct answer, the computer goes to the subroutine at Line 400. If you are incorrect, the next clueword is presented. If you fail to guess after all cluewords, the computer goes to the subroutine at Line 460.

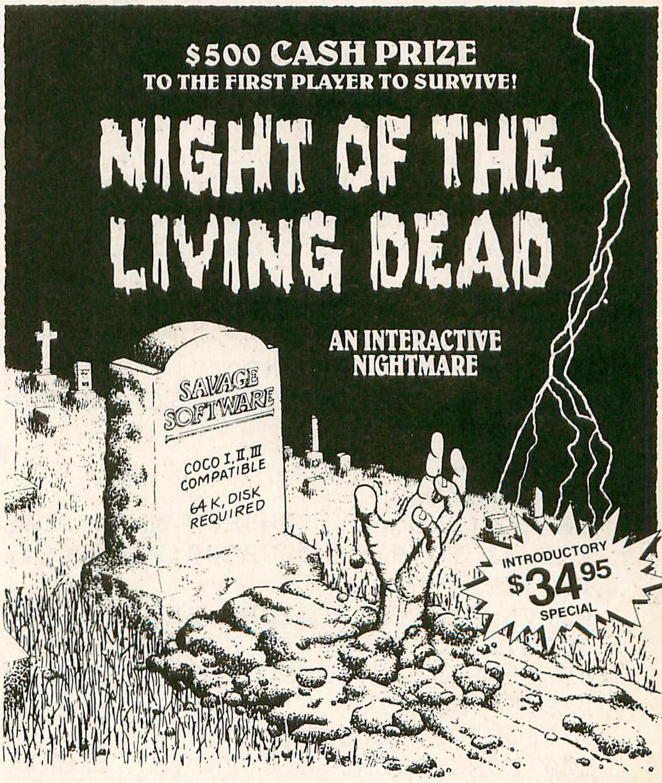
D$	clueword sets and answers
PN$	players' names
PS	players' scores in game
DU	data used in game
RN	random number generator
P	points given for correct answer
V$	used for Speech/Sound Pak
DS	number of data sets in file
NP	number of players in game
GL	master game loop
G	determines `PRINT @` location for players' names and scores
PA	determines `PRINT @` location of cluewords on screen

Figure 1: Variable List

(Questions or comments regarding these programs may be directed to the authors at 10456 Orpheus Dr., El Paso, TX 79924. Please enclose an SASE when requesting a reply.) ☐

Listing 1: `CLUEFILE`

```
1 '**********************
2 '*      cluefile       *
3 '*      (C) 1987       *
4 '*BY JAMES PH LAMONICA*
5 '*& MARY JEAN LAMONICA*
6 '*   EL PASO, TEXAS    *
7 '**********************
10 PMODE0:PCLEAR1:CLEAR12000:DIM
D$(5,300)
20 CLS(3):PRINT@32,"THIS IS A PR
OGRAM TO CREATE THE WORD FILE FO
R THE clueword GAME PLEASE PRESS
 ANY KEY TO BEGIN":EXEC44539
30 PRINT@224,"TO LOAD A PARTIALL
Y COMPLETED   FILE PRESS y, OR E
LSE PRESS n"
40 I$=INKEY$
50 IFI$="Y"THENGOSUB500:GOTO90
60 IFI$="N"THENGOTO90
70 GOTO40
90 CLS(3):PRINT@32,"YOU MAY ENTE
R";300-DS;" SETS OF WORDS FOR cl
ueword. ENTER THE NUMBER OF ADDI
TIONAL SETS YOU WISH ADD";:INPUT
NS
95 IF NS=0 THENGOTO180
100 CLS(3):PRINT@64,"YOU WILL BE
 ASKED FOR FOUR CLUE WORDS AND T
HEN THE ANSWER WORD. PRESS RETUR
N AFTER EACH ENTRY..  PRESS A KEY
 WHEN READY TO BEGIN":EXEC44539
```



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```
110 FORX=DS+1TODS+NS
115 CLS(6):PRINT"SET NUMBER ";X
120 FORY=1TO4
130 PRINT@Y*64,"ENTER clueword #
";Y;:INPUTD$(Y,X)
132 IF D$(Y,X)="^"THENY=Y-2:GOTO
140
140 NEXTY
150 PRINT@320,"ENTER THE ANSWER"
;:INPUTD$(5,X)
160 NEXTX
180 CLS(5):PRINT@96,"TO SAVE THE
 clueword FILE, PUT  IN A DISK A
ND PRESS A KEY PLEASE":EXEC44539
190 OPEN"O",#1,"CLUEDATA"
200 PRINT@200,"SAVING cluedata";
210 FOR X=1TODS+NS:FORY=1TO5:WRI
TE#1,D$(Y,X):NEXTY,X
220 CLOSE#1:GOTO20
500 CLS(4):PRINT@32,"TO LOAD A P
ARTIALLY COMPLETED   FILE, PUT I
N THE PROPER DISK ANDPRESS A KEY
 PLEASE":EXEC44539
505 PRINT@264,"FINDING cluedata"
;
510 OPEN"I",#1,"CLUEDATA"
515 PRINT@264,"LOADING cluedata"
;
520 FOR X=1TO300
530 IF EOF(1)=-1THEN550
540 FORY=1TO5:INPUT#1,D$(Y,X):DS
=X:NEXTY
545 NEXTX
550 CLOSE#1:RETURN
```

Listing 2: CLUEWORD

```
1 '***********************
3 '*BY JAMES PH LAMONICA*
4 '*& MARY JEAN LAMONICA*
5 '*   EL PASO, TEXAS   *
6 '*     (C) 1987       *
7 '***********************
10 PMODE0:PCLEAR1:CLEAR12000:DIM
D$(5,300),PN$(6),PS(6),DU(300)
20 V$="WELCOME TO CLUEWORD. YOU
WILL   BE GIVEN 4 WORDS, ONE AT
A TIME DETERMIN WHAT THE WORDS H
AVE IN COMMON AND TYPE IN THE AN
SWER.  THE FEWER CLUEWORDS YOU N
EED,   THE MORE POINTS YOU WILL
GET."
21 CLS(RND(6)):PRINT@64,V$
25 V$="PRESS A KEY TO BEGIN":GOS
UB500:PRINT@448,V$:EXEC44539:PRI
NT@448,"LOADING clueword FILE FR
OM DISK"
30 OPEN"I",#1,"CLUEDATA"
40 FORX=1TO300
50 IFEOF(1)=-1THEN70
60 FORY=1TO5:INPUT#1,D$(Y,X):DS=
X:NEXTY
65 NEXTX
70 CLOSE#1
80 CLS(RND(6)):V$="HOW MANY PLAY
ERS (1 TO 6)":GOSUB500:PRINT@64,
V$;:INPUTNP
90 V$="ENTER PLAYERS BELOW":GOSU
B500:FORX=1TONP:PRINT@128,"NAME
OF PLAYER";X;:INPUTPN$(X):PRINT@
128,"":NEXTX
95 FOR GL=1TOINT(DS/NP)
100 FORG=1TONP:CLS(RND(6)):FORX=
1TONP:PRINT@17+(X*16),PN$(X);PS(
X);:NEXTX:PRINT@16+(G*16),CHR$(6
2);
110 Q=RND(DS):IF DU(Q)=Q THEN110
111 PA=272
115 FOR L=1TO4
120 DU(Q)=Q:PRINT@PA-INT(.5*LEN(
D$(L,Q))),D$(L,Q);:V$=D$(L,Q):GO
SUB500
130 S=INT(2^(5-L))
140 PRINT@448,"":PRINT@448,"FOR
";S;"POINTS";:INPUTA$
145 IF A$="Q"THENGOTO300
150 IF A$=D$(5,Q) THEN PS(G)=PS(
G)+S:GOSUB400:GOTO220
190 PA=PA+32
200 NEXT L
210 GOSUB460
220 NEXTG:NEXTGL
300 CLS:V$="THE GAME IS OVER AND
 THESE ARE THE FINAL SCORES":GOS
UB500
310 FOR X=1TONP:PRINT@(X*32),PN$
(X);PS(X)
320 NEXTX
399 END
400 V$="YOU ARE CORRECT"+PN$(G):
GOSUB500
405 V$="PRESS A KEY FOR THE NEXT
 SET":GOSUB500
410 EXEC44539:RETURN
460 V$="THE CORRECT ANSWER WAS "
+D$(5,Q):GOSUB500
465 PRINT@448,"":PRINT@464-INT(.
5*LEN(D$(5,Q))),D$(5,Q)
470 V$="PRESS A KEY FOR THE NEXT
 SET":GOSUB500
480 EXEC44539:RETURN
500 XX=&HFF00:YY=&HFF7E:POKEXX+1
,52:POKEXX+3,63:POKEXX+35,60
501 FOR I=1TOLEN(V$)
502 IFPEEK(YY)AND128=0THEN502
503 POKEYY,ASC(MID$(V$,I,1))
504 NEXTI
505 IFPEEK(YY)AND128=0THEN505
506 POKE YY,13
507 RETURN
```

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NOVICES NICHE

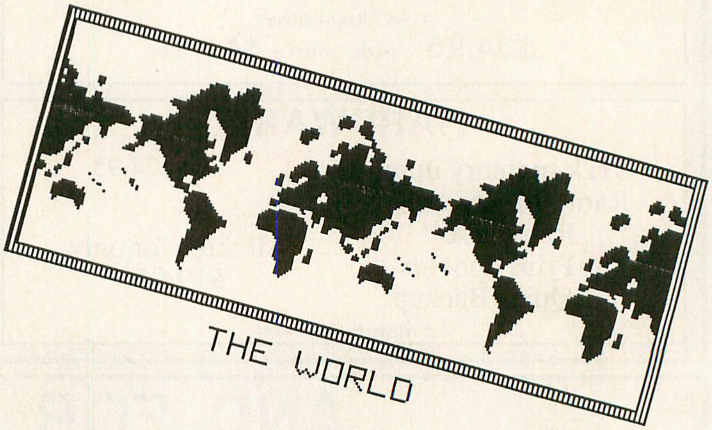
THE RAINBOW is a teaching environment and we realize that the majority of our readers will always be beginners. In our continuing effort to always keep the new user in mind, and in addition to the many beginner feature articles and programs published in every issue, "Novices Niche" contains shorter BASIC program listings that entertain as well as help the new user gain expertise in all aspects of the Color Computer: graphics, music, games, utilities, education, programming, etc.

Education

Buy a CoCo and See the World

16K ECB

By Bill Bernico



This program will draw, frame and label a detailed map of the world — and then duplicate it side-by-side, creating a wraparound version. The last command of Line 60 and all of Line 70 duplicate and label the map. You can eliminate these if you need a world map in one of your own programs. To reposition the map on your screen, simply change the first coordinate in Line 10 from `BM4,19` to wherever you want to start drawing.

The listing: `WORLD`

```
10 PMODE4,1:PCLS1:SCREEN1,1:COLO
R0,1:DIM A(20,20):DRAW"BM4,19D3B
D7D28BD4DFU3BU3U28BU2UBU3U3DFD35
BD3D3EUBU4U35FD34BD7DRU2BU7U33FD
2BD2D28BD8DBRBU3UBU6U26RD25BD6D3
BD4D4FDU6BU6UBU10U21RD20BD6D4BD7
D6EU6BU6U5BU5U20D3RD15BD5DBD2D4B
D6D6RU6BU13U2BU4U14ED15BD4D
20 DRAW"BD14D6RU6BU17UBU5U13BU4U
2RD3BD3D12BD6D2BD16D6RU5BU17U2BU
7U11BU4U2BD8RD9BD27D5FU6BU27U8RD
9BD25D8UEU4BU8U0BU16U12RND13RD12
BD18D0BU30RND8RD7BD24RBU25U6RND6
FD5BD27D0BU32RD5RU4FD3EU2FBD11L2
E2D2BD8FBU9U2BU4U0BU7ED2BD5D2BD2
D3UEU12RD11BD14DFU2BU14U12R
30 DRAW"ND10RD9BD19DBU29RD9RU9FD
9RU10BU7ED2BD4D14FU15BU4U2RD3BD2
D17FD3U26RD27FU29EUD32FU33ED34FU
37RD38NLRU39EUD36BD3D2FU3BU4U35E
D36BD4D3BD2D2FDU6BU7U20BU6U10D9B
D8D22BD4D7FU9BU3U20BU9U10RD12BD1
0D3BD2D10BD5D10BD9D9F2HU14BU3U12
BU6U8BU4U2BU9U13FD13BD7D3
40 DRAW"BD4D7BD7D27U2EU24BU8U3BU
2U2BU12U12FD12BD11DBD3D2BD9D22EU
20BU10U3BU13U14EUD27BD3DBD12D19E
U17BU17U26ED28BD17D15U2EU11BU20U
28RD25BD24D8EU6BU26U25RD24BD27D4
EU2BU29U23FD21BD30D2BRBU27U2BU14
U5FD3BD14D4RU3BU16U2BR9BD39D4FU6
ED7RU8BU2U2BU6U2EUD4BD6D2
50 DRAW"BD2D8RU8BU2U2BU2UBU3NU4F
D6BD3D8FU10BU3U5RBU23D3BD13D2BD4
D6BD3D11FD6U18BU3U6BU3U5BU10U5RD
5BD9D6BD3D6BD3D19FD4U24BU3U7BU2U
7BU8U6RD4BD9D6BD3D8BD3D24FU25BU3
U9BU3U5BU10U3FD2BD9D6BD2D10BD3D2
4EU22BU3U19RD20BD2D21EU20BU2LUEU
17DFD15BD5D13EU11BU6U14RD16
60 DRAW"BDRD3BD12D2BU17U6BU3U12B
U4U2BU10U2ED4BD9D2BD4D10BD4D8BD1
1D5RU5BU11U8BU3U12BU4U3BU8U4RD4B
D6D4BD5D20FU22BU6U2BU6U3RD2BD7D2
BD5D24FD3U32H3GFRD33RU33RD32EU32
ED32RU33BU4HU2EUND5RD5BD4D33FU34
BU3U6FD5BD3D38FU39BU3U3RD3BD3D40
":GET(4,90)-(127,10),A,G
```

```
70 PUT(127,90)-(250,10),A,PSET:L
INE(0,0)-(255,97),PSET,B:LINE(4,
4)-(251,93),PSET,B:POKE178,2:PAI
NT(2,2),,0:POKE178,0:DRAW"BM85,1
05R6L3D8BR6U8D4R6U4D8BR3NR6U4NR4
U4R6BR12D6F2E2F2E2U6BR3D8R6U8L6B
R9ND8R6D4L6R2F4BR3NR6U8BR9D8R5EU
6HL5":PLAY"O5C":EXEC44539
```

Mental Math Blocks

4K

By Keiran Kenny

Mathematical relationships are often more easily grasped when you can examine them visually. Remember back to the first grade, when adding and subtracting were learned in terms of apples and oranges, not just abstract symbols. In that vein, *Add Blocks* can help children with math by accompanying simple addition problems with counting blocks. The program is easy to use, but a small child may need some initial help.

The listing: ADDBLOKS

```
0 'ADDBLOKS' BY KEIRAN KENNY,
  THE HAGUE, 1987.
10 CLS
20 P=96
30 FORX=1TO 1+RND(8)
40 PRINT@P,CHR$(159)
50 P=P+2
60 NEXT
70 Y=X-1
80 Z=Y+RND(16-Y):IFZ=Y THEN80
90 W=Z-Y
100 PRINT:PRINT"HERE ARE"Y"BLOCK
S. HOW MANY MOREDO YOU NEED TO M
AKE"Z"?"
110 PRINT
120 INPUTK
130 IFK=Z-Y THENPRINT:PRINT"RIGH
T!";ELSEPRINT:PRINT"SORRY!";
140 PRINT" YOU NEEDED"W"BLOCK";:
IFW>1THENPRINT"S."ELSEPRINT"."
150 FORX=1TOW
160 PRINT@P,CHR$(175)
170 P=P+2
180 NEXT
190 PRINT@385,"TO TRY AGAIN, PRE
SS ANY KEY."
200 EXEC44539:CLS:GOTO20
```

When in Rome

16K
ECB

By Dan and John Weaver

Although modern Western civilization adopted the Roman alphabet, it rejected the Roman numeral system in favor of the Arabic. But in many schools students are still expected to learn the Roman system to some degree. Some may feel this is a useless exercise, but I feel it is helpful for children to see that there are other ways to represent numbers besides the usual 1, 2, 3, etc.

Roman Numeral tests your child (or you) in Roman numerals. The program presents you with a simple menu that asks you to choose Arabic-Roman or Roman-Arabic translation. Then the program selects a random number and puts it onscreen; you must type in its equivalent in the other system. The computer indicates whether you are right or wrong. If you are wrong, it provides the correct answer. It also keeps a running count of the number of problems completed and the percentage of correct responses. After 20 problems, your final score is given and you are returned to the menu.

There are two levels of play. The easy level covers the numbers 1 through 25. The hard level includes more difficult numbers, such as XCIX and CDXCIX.

The listing: ROMANMRL

```
0 CLS0:FORG=1TO500:NEXTG
1 FORU=488TO9STEP-32:CLS0
2 PRINT@U,"roman numerals";
3 IF U+70<511THEN PRINT@U+70,"by
";
4 IF U+130<511THENPRINT@U+130,"d
an & john";
5 IF U+196<511THENPRINT@U+196,"w
eaver";
6 FORG=1TO100:NEXTG:NEXTU:FORX=1
TO1000:NEXTX
7 TT=0:C=0:T=0:CLS:PRINT@137,"rO
MAN TO ARABIC
8 PRINT@201,"aRABIC TO ROMAN
9 PRINT@265,"qUIT
10 I$=INKEY$:IFI$=""THEN10
11 IFI$="A"THEN13ELSEIFI$="R"THE
N13ELSEIFI$="Q"THEN36
12 GOTO10
13 CLS:PRINT"eASY OR hARD?
14 E$=INKEY$:IFE$=""THEN14
15 IFE$="E"THEN17ELSEIFE$="H"THE
N16ELSE14
16 N=RND(39):GOTO18
17 N=RND(24):GOTO18
18 RESTORE:CLS:PRINT@482,"YOU HA
VE GOTTEN"TT"% RIGHT":PRINT"  YO
U HAVE DONE "T"PROBLEMS
19 IF T=20THEN35
20 FORX=1TON:READA$:NEXTX
21 FORY=N TON+38:READX$:NEXTY
```

```
22 DATA "1","2","3","4","5","6",
"7","8","9","10","11","12","13",
"14","15","16","17","18","19","2
0","21","22","23","24","25","40"
,"44","49","50","90","99","100",
"400","450","499","500","900","9
90","1000"
23 DATA I,II,III,IV,V,VI,VII,VII
I,IX,X,XI,XII,XIII,XIV,XV,XVI,XV
II,XVIII,XIX,XX,XXI,XXII,XXIII,X
XIV,XXV,XL,XLIV,XLIX,L,XC,XCIX,C
,CD,CDL,CDXCIX,D,CM,CMXC,M
24 IFI$="A"THENGOSUB26ELSEIFI$="
R"THENGOSUB29
25 GOTO15
26 PRINT@0,"WHAT IS THE ROMAN NU
MERAL FOR":PRINTA$;:INPUT"";B$
27 IFB$=X$THENGOSUB32ELSEGOSUB33
28 RETURN
29 PRINT@0,"WHAT IS THE ARABIC N
UMERAL FOR":PRINTX$;:INPUT"";B$
30 IFB$=A$THENGOSUB32ELSEGOSUB33
31 RETURN
32 PRINT"correct":FORF=130TO145S
TEP5:SOUNDF,1:NEXTF:SOUND120,1:S
OUND125,1:T=T+1:C=C+1:TT=INT((C/
T)*100):RETURN
33 PRINT"oops!":PRINT"THE CORREC
T ANSWER IS ";:IFI$="A"THENPRINT
X$ELSEPRINTA$
34 T=T+1:TT=INT((C/T)*100):SOUND
1,1:SOUND50,1:SOUND1,1:FORG=1TO9
00:NEXTG:RETURN
35 PRINT@0,"PRESS ANY KEY TO STA
RT NEW GAME":PRINT:PRINT:PRINT@2
68,"game over":EXEC44539:GOTO7
36 CLS:END
```

Answers for Your Questions

4K

By Keiran Kenny

Quiz programs are very popular, but programming them can be difficult — a correct answer can exist in many forms. For example, the answer to the question in Line 1000 of the listing would not only be John Francis Kennedy, but John F. Kennedy, John or J.F. Kennedy, or simply Kennedy. In this program, *Flexiquiz*, any of these answers would be accepted. Spelling errors will *not* be accepted, however.

To use *Flexiquiz* to generate your own quizzes, enter your question and answer as in the examples in lines 1000 through 1090. Because the program uses `INPUT` and is written in Color BASIC, statements must be enclosed in quotes if the question or answer requires a comma or colon. If your CoCo has Extended Color BASIC, you could use `LINEINPUT` instead of `INPUT`. The program's last line must always read `DATA END,END,END`.

The question is read as `A$` and the answer as `B$` in Line 20. Lines 60, 70 and 90 establish strings to account for all variants of a name. The answer can take from one to three words.

The listing: FLEXQUIZ

```
0 'FLEXIQIZ' by Keiran Kenny,
  Sydney, 1988.
10 CLS
20 READA$,B$:IFA$="END"THEN160EL
SECLS
30 PRINT@32,A$
40 FORT=1TOLEN(B$):E$=MID$(B$,T,
1):D$=D$+E$
50 IFE$=" "THENZ=Z+1ELSE80
60 IFZ=1THENF$=D$:L1=LEN(F$):I$=
LEFT$(F$,1)+"."+" ":GOTO80
70 IFZ=2THENG$=RIGHT$(D$,T-L1):L
2=LEN(G$):J$=LEFT$(G$,1)+"."+" "
80 NEXT
90 H$=RIGHT$(B$,LEN(B$)-L1-L2)
100 PRINT@128,"";:INPUTC$
110 IFC$=B$ ORC$=H$ ORC$=F$+H$ O
RC$=G$+H$ ORC$=I$+G$+H$ ORC$=F$+
J$+H$ ORC$=I$+J$+H$ ORC$=I$+H$ O
RC$=J$+H$ THENR=R+1:PRINT@205,"R
IGHT!"ELSEW=W+1:Q=1:PRINT@205,"W
RONG!"
120 IFQ ORC$=B$ THENAN$="THE ANS
WER IS:"ELSEAN$="THE FULL NAME I
S:"
130 PRINT@256,AN$:PRINT@336-LEN(
B$)/2,B$
140 PRINT@393,"PRESS ANY KEY."
150 EXEC44539:D$="":Q=0:Z=0:L1=0
:L2=0:GOTO20
160 IFR=0THENR$=" NONE"ELSER$=ST
R$(R)
170 IFW=0THENW$=" NONE"ELSEW$=ST
R$(W)
180 N$=A$+":"+R$+" RIGHT;"+W$+"
WRONG."
190 PRINT@400-LEN(N$)/2,N$
200 PRINT:END
1000 DATA WHICH PRESIDENT WAS AS
SASSINATEDIN 1963?,JOHN FRANCIS
KENNEDY
1010 DATA WHICH PRESIDENT INTROD
UCED THE 'NEW DEAL',FRANKLIN DEL
ANO ROOSEVELT
1020 DATA WHO LED THE RAID ON HA
RPER'S    FERRY?,JOHN BROWN
1030 DATA WHO WAS THE ORIGINATOR
 OF THE    THEORY OF RELATIVITY?,
```

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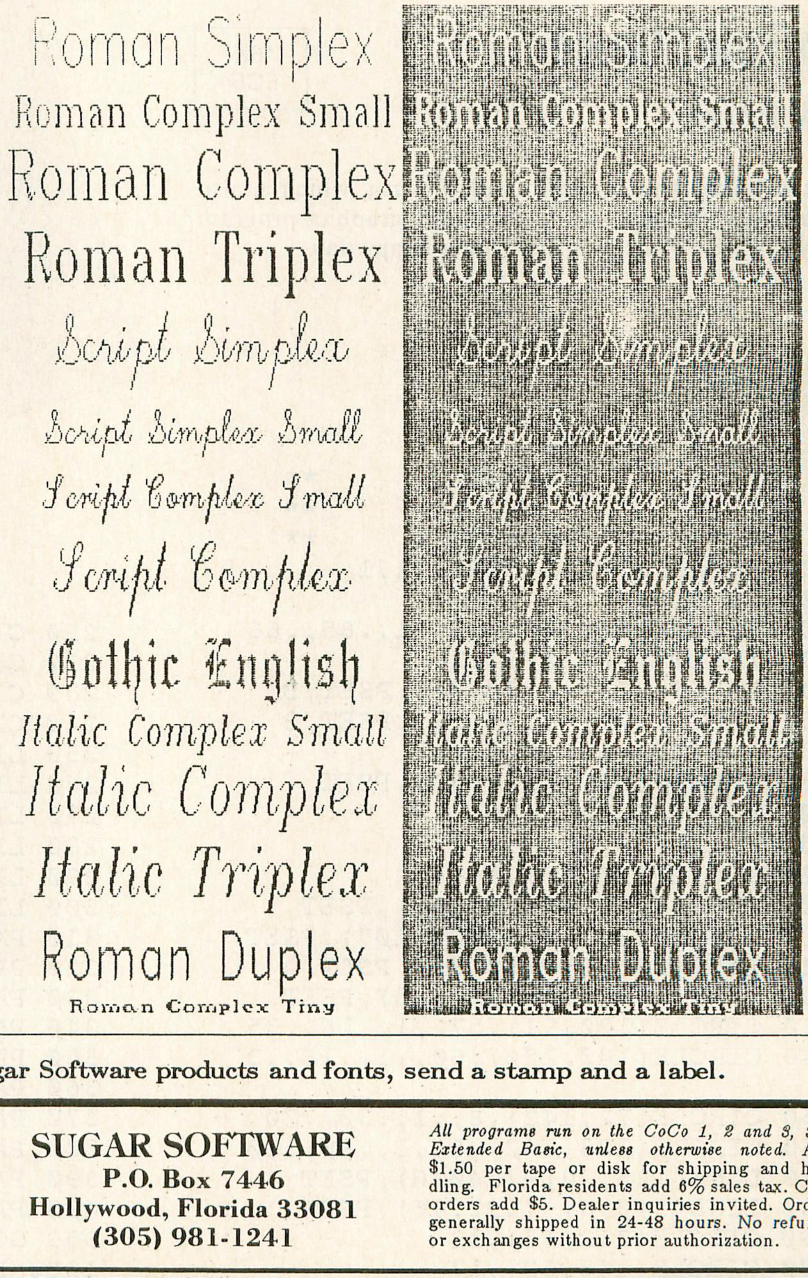

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```
ALBERT EINSTEIN
1040 DATA WHO COMPOSED THE MUSIC
 FOR 'THE PHANTOM OF THE OPERA'?
,ANDREW LLOYD WEBBER
1050 DATA WHICH PHILOSOPHER WAS
THE HERO  OF PLATO'S DIALOGUES?,
SOCRATES
1060 DATA WHO WROTE THE FAMOUS S
TAGE PLAY 'PYGMALION'?,GEORGE BE
RNARD SHAW
1070 DATA WHICH PRESIDENT PRECED
ED ANDREW JACKSON?,JOHN QUINCY A
DAMS
1080 DATA WHICH AMERICAN ADMIRAL
 SAID    'DAMM THE TORPEDOES'?,
JOHN PAUL JONES
1090 DATA WHICH ACTOR ASSASSINAT
ED ABRAHAMLINCOLN?,JOHN WILKES B
OOTH
2000 DATA END,END
```

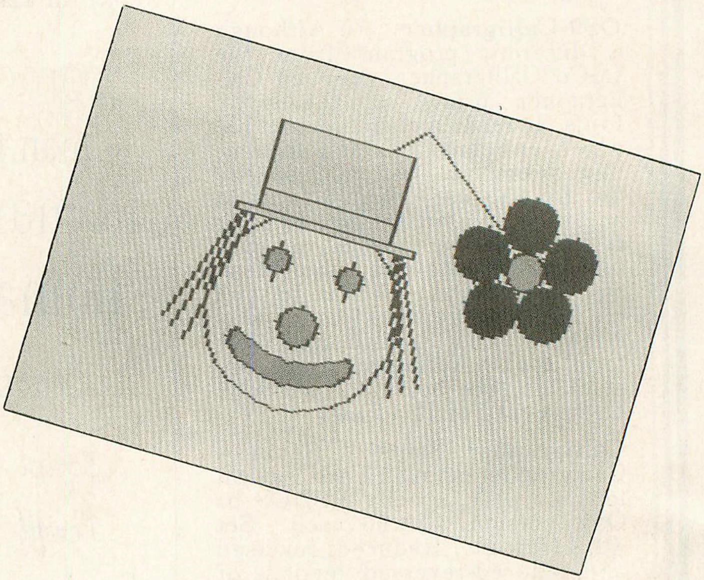
Graphics

CoCo Clowns Around

16K
ECB

By Ana M. Rodriguez

See the lighter side of CoCo with *Payaso*, which is also the Spanish word for clown. I wrote this graphics program for all you CoCo owners to wish you a happy day.



The listing: PAYASO

```
1 REM **        PAYASO         **
2 REM **          BY           **
3 REM **   ANA RODRIGUEZ       **
10 PMODE3,1:PCLS:SCREEN1,1
20 CLS 5
30 CIRCLE(100,120),55,,1,.85,.66
40 CIRCLE(100,127),12
50 LINE(50,75)-(150,71),PSET,B
55 LINE(63,71)-(137,22),PSET,B
60 PAINT(65,69),6,0
65 LINE(63,60)-(137,60),PSET
70 PAINT(52,73),6,0
75 CIRCLE(80,95),9
80 CIRCLE(120,95),9
90 LINE(80,102)-(80,107),PSET
100 LINE(120,102)-(120,107),PSET
110 LINE(80,88)-(80,85),PSET
120 LINE(120,88)-(120,85),PSET
130 CIRCLE(100,91),57,,1,.16,.35
140 CIRCLE(100,100),60,,1,.16,.3
5
150 CIRCLE(72,142),8,,1,.30,.70
160 CIRCLE(128,142),8,,1,.80,.20
170 LINE(125,22)-(140,6),PSET
180 LINE(140,6)-(192,46),PSET
190 CIRCLE(212,65),12
200 CIRCLE(186,62),17
210 CIRCLE(200,89),17
220 CIRCLE(230,84),17
230 CIRCLE(237,55),17
240 CIRCLE(209,40),17
250 LINE(60,75)-(42,150),PSET
260 LINE(57,75)-(35,145),PSET
270 LINE(55,75)-(28,141),PSET
280 LINE(140,75)-(158,150),PSET
290 LINE(143,75)-(165,145),PSET
300 LINE(145,75)-(173,141),PSET
310 PAINT(100,127),7,0
320 PAINT(100,150),7,0
330 PAINT(212,65),7,0
340 PAINT(186,62),8,0
350 PAINT(200,89),8,0
360 PAINT(230,84),8,0
370 PAINT(237,55),8,0
380 PAINT(209,40),8,0
390 PAINT(80,95),7,0
400 PAINT(120,95),7,0
999 GOTO 999
1000 END
```

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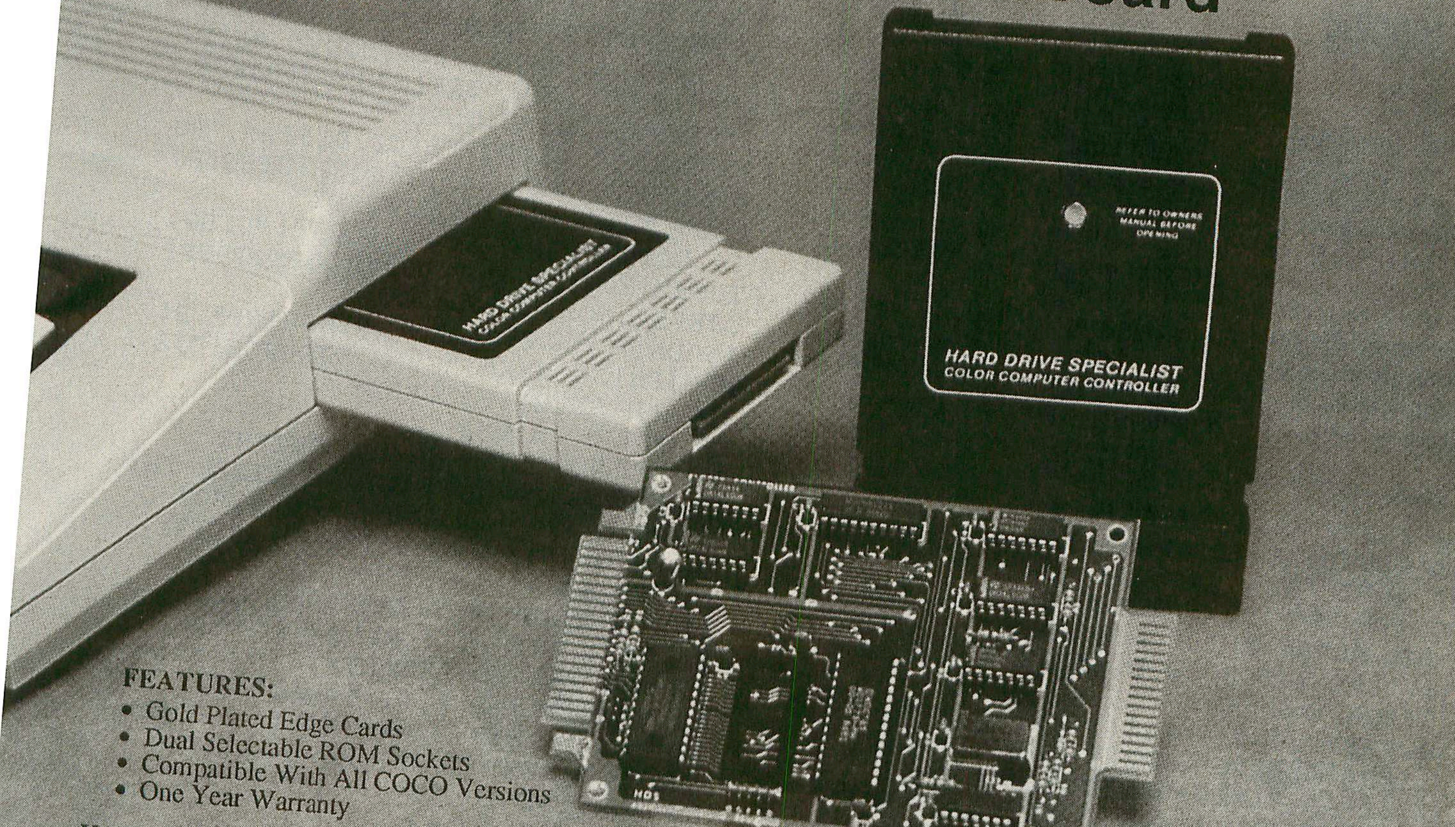
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Music

Cider Sipping

16K
ECB

By Darren Day

Among the things associated with school are apples, the crisp odor of new books and "kid" songs (you know, *"School's out, school's out, teachers let the monkeys out,"* or *"Billy and Betty, sitting in a tree . . ."* — I'm sure you can finish that one). No "kid" song repertoire would be complete without "*Sipping Cider Through a Straw*," and CoCo will make sure you remember it.

When run, the program accompanies the music with an onscreen printout of the lyrics. And to make the program even more exciting, the words have been encoded in `DATA` statements. Note: *Cider* contains the high-speed poke.

The listing: `CIDER`

```
0 CLEAR 400:DIM A$(4,5)
1 GOSUB 18 'DISPLAY TITLE
2 POKE 65495,0
3 FOR X=1 TO 5:GOSUB 21:NEXT X:P
OKE 65494,0 'DECODE DATA
4 ' PLAY SONG & DISPLAY WORDS
5 FOR X=1 TO 5
6 PRINT TAB(4);A$(1,X):PLAY "L8B
L16BA#L8BL2G":PRINT TAB(4);A$(2,
X):PLAY "L8GO+DL16DC#L8DL2O-A"
7 PRINT TAB(4);A$(3,X):PLAY "L8A
O+DDDL2DL8D":PRINT TAB(4);A$(4,X
):PLAY "CO-BAL2GL8G"
8 PRINT:PRINT
9 NEXT X
10 '  ENCODED DATA
11 DATA "UIF!QSFU.UJ.FTU!HJSM","
UIBU!FWFS!J!TBX","XBT!TJQQJOH!DJ
.EFS","UISP(!B!TUSBX"
12 DATA "J!UPME!UIBU!HJSM","J!EJ
EO(U!TFF!IPX","TIF!TJQQFE!DJEFS"
,"UISPVHI!UIBU!TUSBX"
13 DATA "BOE!DIFFL!CZ!DIFFL","BO
E!KBX!CZ!KBX","XF!TJQQFE!UIBU!DJ
EFS","UISPVHI!UIBU!TUSBX"
14 DATA "BOE!BMM!BU!PODF","UIBU!
TUSBX!EJE!TMJQ<","J!TJQQFE!TPNF!
DJEFS","GSPN!IFS!MJQ"
15 DATA "BOE!OPX!J(WF!HPU!NF",B!
NPUIFS!JO!MBX","GSPN!TJQQJOH!DJE
FS","UISPVHI!B!TUSBX"
16 GOSUB 25:END
17 ' TITLE SCREEN SUBROUTINE
18 CLS:PRINT@2,"SIPPING CIDER TH
ROUGH A STRAW":PRINT @32+9,"BY D
ARREN DAY":PRINT STRING$(32,131)
19 RETURN
20 ' DECODE DATA SUBROUTINE
21  FOR Y=1 TO 4:READ L$
22 FOR P=1 TO LEN(L$)
23 B$=MID$(L$,P,1):C=ASC(B$)
24 C=C-1:A$(Y,X)=A$(Y,X)+CHR$(C)
:NEXT P:NEXT Y:RETURN
25 FOR Y=0 TO 31
26 FOR X=0 TO 63
27 SET (X,Y,0):NEXT X:NEXT Y
28 RETURN
```

Utility

CoCo ASCII Table

On "Misc" Tape, 20 Aug 88.

CoCo
3

By Ken Ostrer

Time after time in my programming escapades, it seems I'm looking for just the right character to spice up my program. It helps to see all the possible characters in one place. If you have a CoCo 3, this program will display the entire CoCo 3 character set and its respective ASCII codes on the 80-column screen. You can alternate between decimal and hexadecimal values by pressing any key when the display is complete.

The listing: `ASCII3`

```
10 ON BRK GOTO110
20 POKE65497,0:WIDTH80:CLS3:ATTR
6,4:CLS:S=32:E=51:Z=0:V=0
30 FORX=S TO E:IFX>255THEN80
40 LOCATEZ+1,V:PRINTCHR$(X);:LOC
ATEZ,V+1:IFT=0THENPRINTX;ELSEPRI
NT"$"HEX$(X);
50 IFX=32THENLOCATE1,0:PRINT"Sp"
;
60 Z=Z+4:NEXTX
70 V=V+2:S=E+1:E=E+20:Z=0:GOTO30
80 PRINT"   The entire Color Com
puter 3 character set...";:K$=IN
KEY$
90 K$=INKEY$:IFK$=""THEN90ELSEIF
T=-1THENT=0ELSET=-1
100 GOTO20
110 POKE65496,0:CLS:END
```

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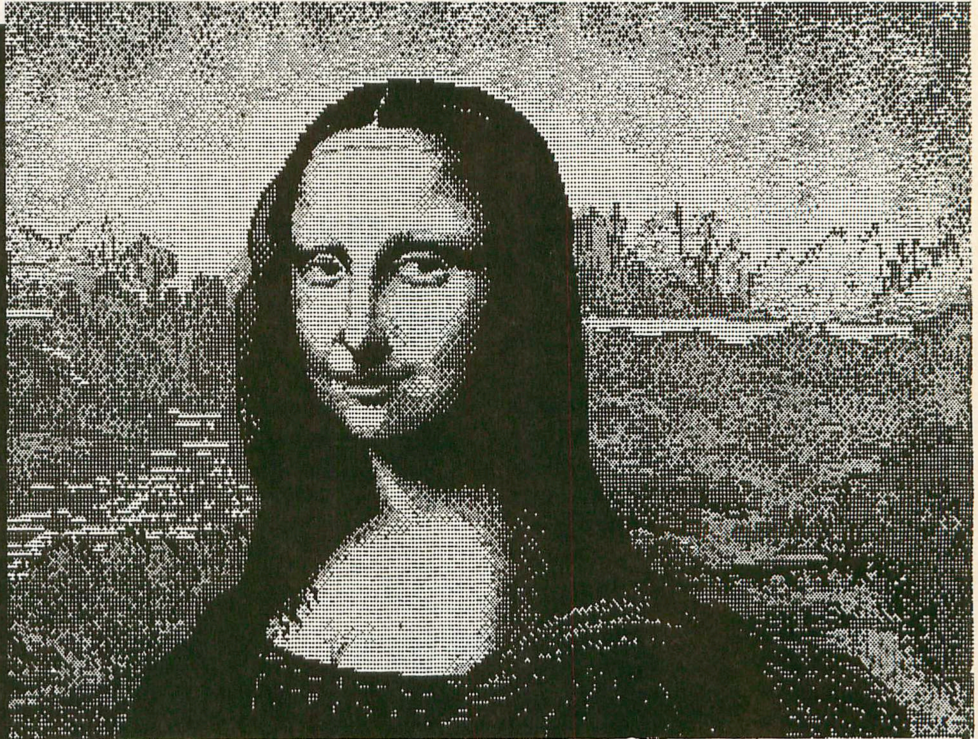

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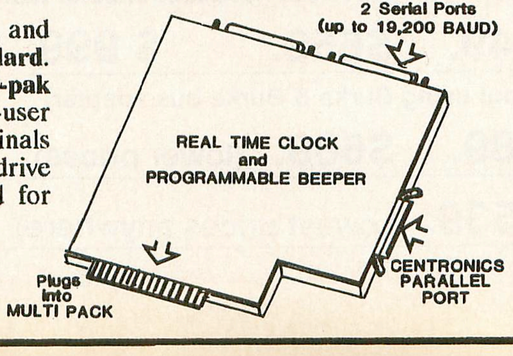

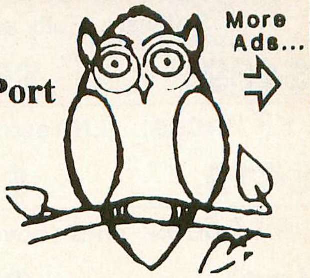

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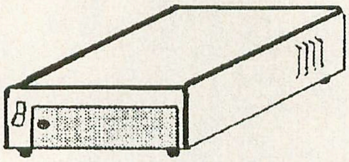

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(na)	$489.	$609. (lower prices)	

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A tutorial for the DRAW statement in producing CoCo graphics

Creating a Utility Screen Worksheet

By Joseph Kolar
Rainbow Contributing Editor

During our stroll through CoColand's BASIC, we can't fail to stumble over the statements used to create graphics. If we wander past them, we wistfully dream of creating masterpieces. We visualize ourselves as the Rembrandts of the keyboard.

As a newcomer to CoCo graphics, remember that if you fail to grasp some of the fine points of any tutorial presented, work along anyway. You are certainly going to find interesting hints and techniques and say, "I didn't know that!" You can always set this issue of THE RAINBOW aside. After you have progressed further in mastering BASIC, you can pick it up and, fortified with more knowledge, tackle it at a later time. There is little in THE RAINBOW that becomes obsolete.

For the umpteenth time, you are urged to guard the back issues with your life. You'll find them to be your prime source of reference material. So much for the unsolicited commercial!

The subject for today is the `DRAW` statement, complete with our usual hands-on programming practice. To get the maximum utilization from `DRAW`, you are requested to purchase graph paper in an 8½-by-11-inch pad, with four squares to the inch (also known as quad-ruled paper). You will also find valuable a black and/or red nylon-tipped pen that makes a heavy line. You will need these items later, when we really get warmed to our subject.

Michelangelo made sketches, as you will — his modern day counterpart — at the CoCo easel. In the meantime, take a few deep breaths to relax you and fire up the computer. We will create a neat utility that you will enjoy using.

Look at Listing 1. The secret is out — you are going to make graph paper on your CoCo. Key in the program lines as they are requested. Key in Line 10.

If you are curious about why we must `CLEAR 500`, omit Line 5 for the moment. At some point, as we work through this tutorial together, you will get an Out of String Space error message. The solution is to key in Line 5.

Key in Line 50 until you reach the closing quote mark; press ENTER. Key in the "hold" line, Line 300. Press ENTER and the `BREAK` key, and list Line 50.

Using the `DRAW` statement and Color C2 at grid coordinates horizontal 0 and vertical 0 on the Hi-Res screen, we use `D10` to move ten spaces or units down on the vertical, (0,10). `R240` proceeds to make a horizontal line from (0,10) to (240,10). We now have one line. This is half of our work-horse, `D10R240`. Since we want to place another horizontal line ten units below our first line, we use `D10` again to drop down to (240,20). We continue by using `L240` to draw our second horizontal line to end at (0,20). This is the other half of our work-horse.

Note that CoCo gave you a break and printed a continuous, zigzag line whether or not you closed Line 50 with a closing quotation mark. Make it a point to enclose any necessary information between quotation marks. You may not be so lucky the next time. Note also that the coordinates in parentheses can be ignored. They are for the inquisitive beginner who may want to use `LINE` statements. `LINE` can do a lot of things that `DRAW` does. Finally, you may have guessed how we expect to proceed.

`D10R240D10L240` was repeated again. You can see that using our complete work-horse makes for a long, boring program line that is subject to error and a pain in the neck to debug.

Key in Line 20. We are going to put the first half of our work-horse into String `A$` and the other half into `B$`.

Right away, the more astute beginner will wonder, "Why not put both of them into one string?" There are many ways to accomplish the mission, but this way is easier for the newcomer to grasp.

We are going to use concatenation to finish our horizontal lines. Think of each string and its contents as a freight train boxcar. Each boxcar is coupled to the end of the train with the coupler '+.' `A$` creates the zig and `B$` creates the zag.

Key in and list only the `E$` string in Line 40. The new string, `E$`, makes bigger boxcars. Look carefully and you will deduce that `E$` is equal to the contents of Line 50 as it now stands. Hook up three `E$` boxcars to Line 50 so it looks exactly like the listing of Line 50, and run. Isn't that easy?

If that is the case, try this: type `EDIT50` and press ENTER and the space bar until the cursor is under the first 'D.' Count the number of characters (28) to be deleted; type `28 D` to remove them, and press ENTER to get out of the Edit mode. `E$` replaces the components of the zigzag. Did you add an `E$` boxcar?

The horizontal lines are finished. What about those pesky vertical lines? Just as Rembrandt paints over other colors, so will we artists when we get around to the border.

To create vertical lines, we use the same format. Key in Line 60 as far as the closing quote mark, and press ENTER. The zigzag will progress from left to right. Run the line and look it over! Can you conceptualize it? If not, put a `REM` at the beginning of Line 50 and run it, then take out the `REM`. Can you figure out why the color of the vertical zigzag is different? In masking Line 50, we hid Color C2, and default Color C4 was used.

Key in Line 30. Note `C$` is the first half of the work-horse `R10D160`, and `D$` is the second half.

Edit Line 40 to add the `F$` boxcar that contains `C$D$C$D$`. Make sure you use a colon to separate the two giant boxcars, `E$` and `F$`.

Edit Line 60 to add five `F$` boxcars. Compare it with the listing to make sure you are doing it right, and run it. We have a 240-by-160 sheet of graph paper. Each box is ten units wide and ten units long.

We may as well add a nice border. Key in Line 70. Using Color C4 and beginning at (0,0), we make one continuous

---

Florida-based Joseph Kolar is a veteran writer and programmer who specializes in introducing beginners to the powers of the Color Computer.

line to box it in. Run the line. For practice put a REM in front of Line 70, and using Line 71, create the same border with the LINE statement. If you have trouble getting the correct color, insert at the beginning of Line 71 COLOR4: or DRAW''C4":. Either will work.

If you get Line 71 correct, you can leave Line 70 masked and use Line 71, or you could mask Line 71 and unmask Line 70. It is a shame to kill such good work; it never hurts to save your work, even if it's hidden in REMs.

Notice that lines 80 and 90 are masked with REMs. They are reference lines that break up the graph into 4-by-4 boxes. On occasion you will find them useful.

Key in lines 80 and 90 without the REMs. You will note that they were composed using the same technique as in lines 50 and 60.

Since each line is +10 units from the previous one, Line 95 is a test line. We put a dark dot at (20,20). Can you see it? Now you know where (20,20) is. Change Line 95 to some other coordinates, such as (60,60) or (100,150). Play around until you get bored. Remember, PSET is a valuable command in graphic applications. For instance, it can be used to locate a spot inside a small area that you want to PAINT but have difficulty in picking up the PAINT coordinates.

Delete Line 95. Make a REM Line 95, and type:

```
95 'USE S4 IN DRAW STATEMENTS TO
GET A REALISTIC GRAPHIC SCREEN.
EACH SQUARE IS 10 UNITS TO THE
SIDE.
96 'USE S40 WHEN YOU ARE USING IT
AS A SCREEN WORK-SHEET WHICH WILL
BE EQUIVALENT TO GRAPH PAPER.
EACH SQUARE WILL BE ONE UNIT TO A
SIDE.
```

Mask or unmask lines 80 and 90 to suit yourself, and save a few copies on tape. You are the proud possessor of your own utility screen worksheet.

> ***"You are urged to guard the back issues with your life. You'll find them to be your prime source of reference material."***

Delete lines 95 and 96. We will use S40 so we have a graphic worksheet. You may want to enter a single direction at a time to see what is being created.

Key in Line 100. Beginning at a point 10 units to the right and 20 down, using Color C3, we go one unit in Direction E, then one space in Direction F. (You may use E1, F1, etc., instead of E, F, etc. Be professional and leave out the redundant 1).

At Point (10,20), we drew a "pencil" line one space in Direction E, (20,10). Starting at this location, we went one space in Direction F, (30,20); one space in Direction G, (20,30); and linked to the first point, (10,20), using H.

Stop at any time and make designs at other locations. Experiment! Satisfy your curiosity!

Key in Line 110. A square one unit or space per side is created demonstrating RDLU directions.

Key in Line 115. There are many ways to duplicate this pattern. One way is demonstrated. If you wanted that pattern in exactly the same location, your initial starting point could be at any point on the pattern. If you wanted to begin at the upper left-hand corner, your line would read:

```
DRAW"BM90,10RD2RULU2U"
```

Beginning at (110,30) in the lower left-hand corner, type:

```
DRAW"BM110,30UL2URD2R"
```

Key in Line 120. The initial point is (130,20). Type 121 PSET(130,20,2) and run. You can hardly make it out, but the left side is broken. That is the starting point. Study Line 120 to see how the square was created.

You may ask, "Why don't you start in a corner?" In the real world, you may have to start at locations that are inconvenient in order to create a specific design. That's life!

Delete Line 121, and key in Line 130. We demonstrate how to create a cross from a central point. We use N, a neat DRAW command that tells CoCo to draw a line X units long in a desired direction and, upon completion, to return to the point where the specific line originated. From (180,20), a line is drawn up and back to its origin using NU, (180,20). From this point a line is drawn one unit to the right and back, NR; then one unit down and back up and finally one unit to the left, L. We didn't bother using NL because it didn't matter where we ended. We ended at (170,20). For prac-

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tice, using L add G and using NL add G. Run the lines to compare them.

Key in Line 140. This is double the size of the cross in Line 130. Note the last element, NR2, was used to make sure it ended at mid-point, (20,60). The end point is at (0,80).

Key in Line 160 and run it. This is a reference point, around which some pattern will be drawn. A box two units per side will be drawn around it.

Key in Line 170. We use the B command to move to some point along which the line will pass. We could have chosen to begin at any one of eight points. In Line 170, we move one unit left without leaving a visible line, using B (move but don't leave a line in direction L, left one unit). At this point, (50,60), you could go up one unit and proceed clockwise or down one unit and go counter-clockwise.

Key in Line 171. Using the reference point we determined in Line 160, an eight-cornered star one unit per side was diffused.

Key in lines 180 through 186 to see the solution to a problem presented in a former article. The idea is to make the resultant shape in one continuous line, without lifting the pencil from the paper and not crossing any line. Remember, the screen is a substitute for a page of quad-ruled graph paper. To see the shape germinate, run the line, delete lines 181 through 186, and run again after entering each line separately.

Key in and run Line 190. This is the reference point around which we will create a design.

Key in and run Line 191. Around this central point, we will create a diamond two units per side. It was chosen to move in invisible units to the left, BL2, and create a design in a clockwise direction.

Key in Line 192. We began at the reference location and picked up our point of departure by moving one invisible unit in Direction H. We went two units left, two units down and two units right, L2D2R2, ending at (110,130).

You've probably figured out that we are going to add that shape to all four points of the diamond.

Key in Line 194 and run. Key in and run Line 195. We ended up at Point (110,110). From lines 192 to 196, we move without taking our imaginary pencil from the paper.

Key in Line 196, beginning where we left off in Line 195. Look at the line in the listing to see how we created it and where we ended, (110,130).

Continuing our design, we will make a diagonal three units long emanating outward, starting at the points where the four arms of the one unit X end.

Key in Line 197. Beginning at (110,130), we made a line three units long in G direction and return to point of origin, (110,130), NG3.

Key in Line 198. We made an invisible line two units up, BU2; using NH3, we made a line three units long in H direction and returned to the initial point.

Lines 199 and 200 complete the design. Put them on, one at a time, and check them out.

Now, for homework. If you have the guidelines in lines 80 and 90 set, mask them with REM.

Remove the clutter. Type and run DEL100-190. How about that?

Recall that we must use S40. We wiped it out! Type EDIT191, press ENTER and the space bar so that the cursor is under 'C.' Press I for insert mode and type S40; press ENTER. You got it!

Change the location in lines 191 and 192 so that the design is centered on the graph paper. After you center your *objet d'art*, determine where your final resting point is, or use your new central reference point to create enhancements to this design. If you prefer, copy this shape onto real graph paper. From either the listing or the screen, sketch something out, van Gogh! Using your new tool and program lines, transfer it to the screen.

You can begin at any point you choose, go in any direction you like, skip around from area to area. This is where I use a heavy pen. After the sketch on real graph paper is finalized, go over the lines boldly with the heavy pen to accent the lines. It makes for easy counting of line lengths and directions.

When you get something you like and figure you can't work your will any further, delete lines 20 through 90. Bye-bye, graph paper. Hello, design! Remember, though, that it is not centered on the screen! If you want to truly center it, adjust it to center at (128,96).

Save your new graphic tool. Next month we will continue to give Leonardo da Vinci a bit of competition. ☐

The listing:

```
0 'GRAPHPAP
5 CLEAR500
10 PMODE3,1:PCLS:SCREEN1,0
20 A$="D10R240":B$="D10L240"
30 C$="R10D160":D$="R10U160"
40 E$=A$+B$+A$+B$:F$=C$+D$+C$+D$
50 DRAW"C2BM0,0D10R240D10L240D10
R240D10L240"+E$+E$+E$
60 DRAW"BM0,0R10D160R10U160R10D1
60R10U160"+F$+F$+F$+F$+F$
70 DRAW"C4BM0,0R240D160L240U160"
80 'DRAW"C4BM0,40R240D40L240D40R
240D40L240"
90 'DRAW"BM40,0D160R40U160R40D16
0R40U160R40D160"
95 PSET(20,20,4)
100 DRAW"S40C3BM10,20EFGH"
110 DRAW"BM60,20RDLU"
115 DRAW"BM100,20ULDR2DLU"
120 DRAW"BM130,20UR2D2L2U"
130 DRAW"BM180,20NUNRNDL"
140 DRAW"BM220,20NU2ND2NL2NR2"
150 DRAW"BM20,60NH2NE2NF2G2"
160 PSET(60,60,4)
170 DRAW"BM60,60BLUR2D2L2U"
171 DRAW"BM60,60NLNHNUNENRNFNDG"
180 DRAW"BM10,110U2"
181 DRAW"EF"
182 DRAW"L2"
183 DRAW"FG"
184 DRAW"R2H"
185 DRAW"E"
186 DRAW"D2"
190 PSET(120,120,1)
191 DRAW"C3BM120,120BL2E2F2G2H2"
192 DRAW"BM120,120BHL2D2R2"
193 DRAW"D2R2U2"
194 DRAW"R2U2L2"
195 DRAW"U2L2D2"
196 DRAW"FNFNEG"
197 DRAW"NG3"
198 DRAW"BU2NH3"
199 DRAW"BR2NE3"
200 DRAW"BD2F3"
300 GOTO300
```

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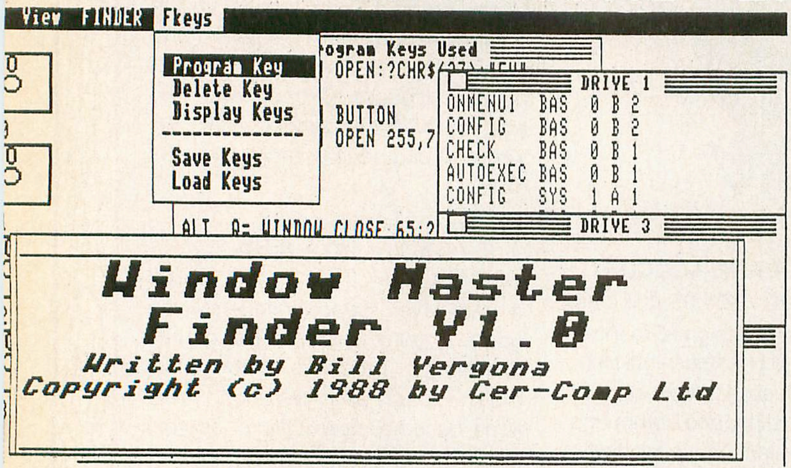

```
ogram Keys Used
OPEN:?CHR$
BUTTON
OPEN 255,7
ALT  A= WINDOW CLOSE 65:?
```

```
ONMENU1  BAS  0 B 2
CONFIG   BAS  0 B 2
CHECK    BAS  0 B 1
AUTOEXEC BAS  0 B 1
CONFIG   SYS  1 A 1
```

Window Master
Finder V1.0
Written by Bill Vergona
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Screen Display Fonts

Window Master supports up to 54 different character sizes on the screen with 5 different character styles. You can have Bold, Italic, Underlined, Super-Script, Sub-script or Plain character styles or any combination of them in any character size. You can also change the text color and background at any time to get really colorful displays.

Fully Basic Compatible

Window Master is fully compatible with Enhanced Color Disk basic with over 50 Commands & functions added to fully support the Point & Click Window System. Window Master does not take any memory away from Basic, so you still have all the Basic Program memory available.

Hi-Resolution Displays

Window Master uses the full potential of the Color Computer 3 display by using the 225 vertical resolution display modes instead of the 192 or 200 resolution modes like most other programs. It uses either the 320/16 color mode or the 640/4 color display to give you the best display resolution possible, and can be switched to either mode at any time.

Window Master Features

Multiple Windows

Window Master supports multiple window displays with up to a maximum of 31 windows on the screen. Overlapping windows are supported, and any window can be made active or brought to the top of the screen. Windows can be picked up and moved anywhere on the screen with the mouse. There are 6 different Window styles to choose from and the window text, border and background color is selectable.

Pull Down Menus

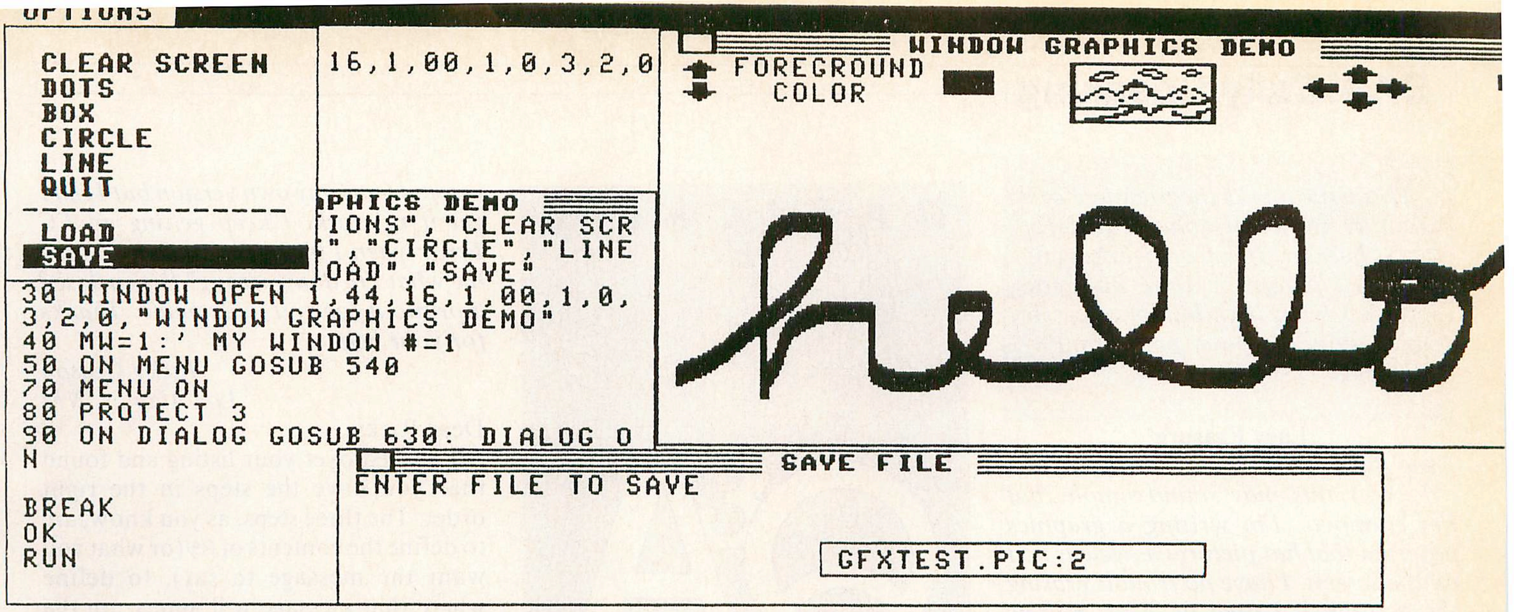
Menus are completely programmable with up to 16 menus available. They can be added or deleted at any time in a program. Menu items can be enabled, disabled, checked or cleared easily under program control. Menu selection is automatically handled by Window Master & all you have to do is read a function variable to find out which menu was selected.

Buttons, Icons & Edit Fields

Each Window can have up to 128 buttons, Icons or Edit fields active, if you can fit that many. Buttons, Icons and Edit field selection is handled automatically by Window Master when the mouse is clicked on one. All you have to do is read a Dialog function to find out which Button, Icon, or Edit field was selected, its very simple.

Mouse & Keyboard Functions

Window Master automatically handles the Mouse pointer movement, display and button clicks. It will tell you the current screen coordinate, the local window coordinate, window number the mouse is in, the number of times the button was pressed, which window number it was clicked in and more. The Keyboard is completely buffered, and supports up to 80 programmable Function keys that can contain any kind of information or command sequences you can imagine. You can load and save function key sets at any time. So, you can have special sets of function keys for different tasks. The "Ctrl" key is supported so that you have a full control code keyboard available.



```
16,1,00,1,0,3,2,0
PHICS DEMO
IONS","CLEAR SCR
","CIRCLE","LINE
OAD","SAVE"
30 WINDOW OPEN 1,44,16,1,00,1,0,
3,2,0,"WINDOW GRAPHICS DEMO"
40 MW=1:' MY WINDOW #=1
50 ON MENU GOSUB 540
70 MENU ON
80 PROTECT 3
90 ON DIALOG GOSUB 630: DIALOG O
N

BREAK
OK
RUN
```

Mixed Text & Graphics

Window Master fully supports both Text & Graphics displays and even has a Graphics Pen that can be used with HLINE, HCIRCLE, HSET and more. You can change the Pen width & depth and turn it on or off with simple commands. We also added Enhanced Graphics Attributes that allow graphics statements to use And, Or, Xor and Copy modes to display graphic information. With the Graphics enhancements added by Window Master, you could write a "COCOMAX" type program in Basic! In fact we provide a small graphics demo program written in Basic.

Event Processing

Window Master adds a powerful new programming feature to Basic that enables you to do "Real Time" Programming in Basic. It's called Event Trapping, and it allows a program to detect and respond to certain "events" as they occur. You can trap Dialog activity, Time passage, Menu Selections, Keyboard activity and Mouse Activity with simple On Gosub statements, and when the specified event occurs, program control is automatically routed to the event handling routine, just like a Basic Gosub. After servicing the event, the sub-routine executes a Return statement and the program resumes execution at the statement where the event occured.

Enhanced Editing Features

Window Master adds an enhanced editor to Basic that allows you to see what you edit. It allows you to insert & delete by character or word, move left or right a word or character at a time, move to begin or end of line, toggle automatic insert on/off or just type over to replace characters. The editor can also recall the last line entered or edited with a single key stroke. You can even change the line number in line to copy it to a new location in the program.

Window Master Applications

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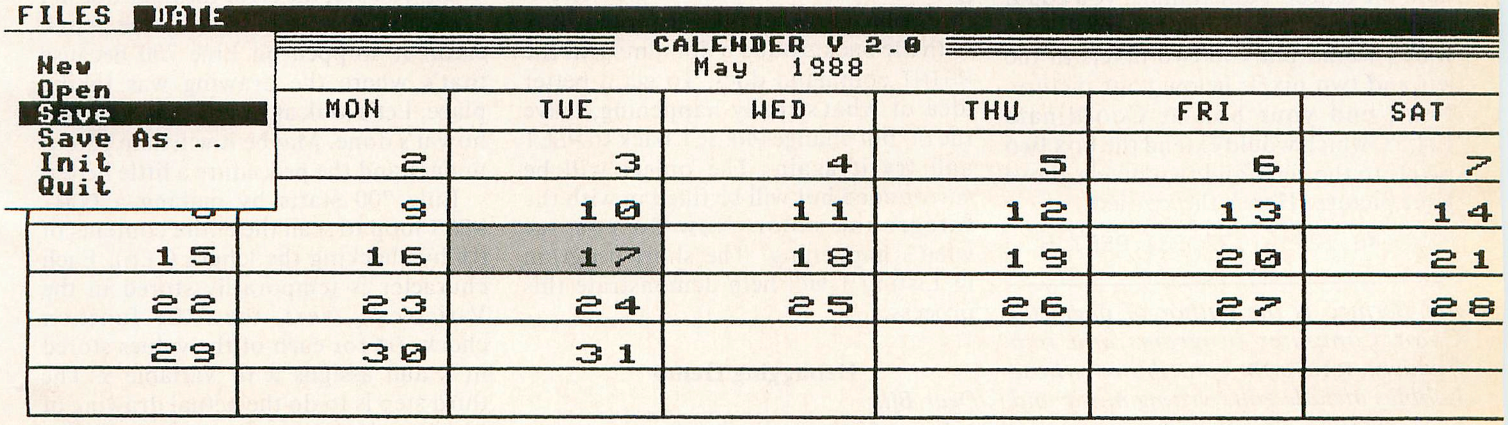

CALENDAR V 2.0
May 1988

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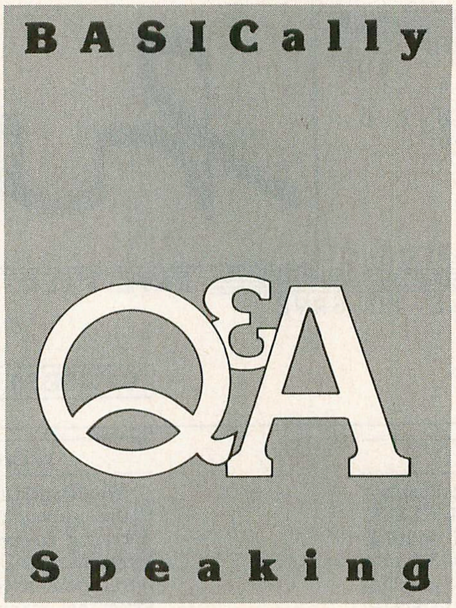
This issue marks the premiere of a monthly technical column just for BASIC hackers. If you are working on a BASIC program that has you stumped, write in to Bill for a fix. He can help solve your programming problems.



By Bill Bernico
Rainbow Contributing Editor

Easy Erasure

Dear Bill:

I know this may sound simple, but I'm stumped. I'm writing a graphics program that has pictures as well as text on the screen. I have no trouble erasing the text when I need to. I just redraw it in the background color to make it disappear. My trouble comes when I want to remove larger items from the screen. Drawing them again would take up too much time and memory. How can I accomplish this and still keep the number of lines to a minimum?

Keith Steffen
Boise, ID

Dear Keith:

As a matter of fact, this very question used to puzzle me. Until I did some research and experimenting, I used to erase my pictures by using the `LINE` command, drawing lines back and forth across the picture in the background color. Needless to say, this took more time and memory than I wanted to spend. Here's how I solved it.

Let's suppose my picture, in this case a picture of a car and two circles, is drawn (with `DRAW`) at Coordinate 50,125 and is about 125 pixels long by 65 pixels high. Your first step is to form a box around the object you want erased. Using the `LINE` command, start at coordinates that are just a bit larger than the object. For example, you could begin your box at Coordinate 48,127 — which would put you two pixels to the left and two pixels below your picture. Next, end your box at Coordinate 177,58, which would extend the box two pixels to the right and two pixels above your picture. Here's the syntax:

```
LINE(48,127)-(177,58),PSET,B
```

The `B` at the end of your line will draw a box around your picture. While you still haven't erased the picture yet, at least now you know how big to make the box in order to completely surround it. Keep in mind you may not always know how big your picture is just by looking at it, so you may have to surround the object. Once you have the box the size you need, change the program line to read like this:

```
LINE(48,127)-(177,58),PRESET,BF
```

You will notice that `PSET` was changed to `PRESET` and `B` was changed to `BF`. `PRESET` changes your box to the background color, which makes it invisible. `BF`, or background fill, fills in that box with the background color almost as the `PAINT` command does. To get a better idea of what's really happening, leave the `BF` but change `PRESET` back to `PSET` and try it again. The object will be surrounded but will be filled in with the foreground color. Now do you see what's happening? The short program in Listing 1 will help demonstrate this process.

Debugging Demo

Dear Bill:

I typed in your English font program from the May '88 issue ["Ye Olde Font," Page 36]. It's a neat concept and I wanted to try my own version but I can't get it to work. I keep getting an FC Error when I try to run it. Can you tell me what I'm doing wrong? I've enclosed a printout for you to examine. Thanks for your help.

Ricky Geason
Los Alamos, NM

Dear Ricky:

I looked over your listing and found that you have the steps in the right order. The three steps, as you know, are to define the contents of `A$` (or what you want the message to say), to define where that message will appear on the screen by including the `DRAW` statement with horizontal and vertical coordinates — so far, so good — and to `GOSUB` to the routine that does the actual drawing of the letters on the graphics screen.

Since you did those steps correctly, I have to assume that what you are trying to draw is incorrectly defined. In Listing 2, I have included a segment of your program as written.

If you will look at your listing once more, you will see that in Line 350 you defined `A$(65)`, the ASCII symbol for a capital A, so that it will draw off the screen, creating that FC (function call) Error. You probably meant to type in `"U8R4D8U4L4D4BR8"`. Instead, you inadvertently entered `"U800R4D8U4L4D4BR8"`.

It's an easy enough mistake to make. But when you got to Part 3, the `GOSUB`, that routine told the program to go to `DRAW` Coordinate 10,10 and start drawing up 800 pixels. Since you were already at a vertical coordinate of 10, drawing up 800 pixels put you off the top of the screen, causing the FC Error in Line 700.

So, you see, the error message doesn't always point to the line with the actual error. It stopped on Line 700 because that's where the drawing was taking place. Let's look at Line 700 and see just how it's done. Maybe it will help you to understand the procedure a little better.

Line 700 starts by making a `FOR-NEXT` loop to scan the entire contents of `A$` by checking the length (`LEN`). Each character is temporarily stored in the Variable `X`. Next, the `MID$` function checks `A$` for each of the values stored in `X` and assigns it to Variable `Y`. The third step is to do the actual drawing of `A$(Y)`, which contains each character within the original `A$`. The `FOR-NEXT` loop is continued until all characters in

---

Bill Bernico is the author of over 200 Color Computer programs and is a frequent RAINBOW contributor whose hobbies include golf, writing music and programming. Bill is a drummer in a rock band and lives in Sheboygan, Wisconsin.

A$ are checked, assigned and drawn before it returns to see if another line containing A$ has been defined.

A good way to find which line has the error is to modify Line 610. The easiest way would be to shorten A$ by one character at a time. For example, have A$ contain the letters A through F and try it. If there's still an error, try A through E, A through D, A through C, and so on until the error no longer shows up. When that happens, you'll know that the last character you omitted from A$ was the troublemaker and can easily modify that particular line.

The debugging procedure can even get to be fun after a while. You may discover through trial and error new and exciting ways of doing what used to be bothersome. □

Listing 1:

```
10 PMODE4,1:PCLS1:SCREEN1,1:COLO
R0,1
20 CIRCLE(20,20),15
30 CIRCLE(200,170),15
40 DRAW"BM50,125R20U10R20D10R45U
10R20D10R20U35L30U30L75D30L20D35
50 PAINT(55,115),0,0
60 FOR X=1 TO 2000:NEXT X
70 LINE(48,127)-(177,58),PRESET,
BF
80 DRAW"BM70,80U2L4D8R4U3L2BD3BR
6U8R4D8L4BR7U8D2F4U6D8BR3NR4U4NR
3U4R4
90 GOTO 90
```

Listing 2:

```
10 DIMA$(90):PMODE4,1:PCLS1:SCRE
EN1,1:COLOR0,1
20 '...
30 '...
40 '...
350 A$(65)="U8R4D8U4L4D4BR8
360 A$(66)="U8R3FD2GNL3FD2GL3BR8
370 A$(67)="BUU6ER2FBD6GL2BR7
380 A$(68)="U8R3FD6GL3BR8
390 A$(69)="NR4U4NR3U4R4BD8BR4
400 A$(70)="U4NR3U4R4BD8BR4
410 '...
420 '...
430 '...
610 A$="ABCDEF":DRAW"BM10,10":GO
SUB700
620 '...
630 '...
640 GOTO 640
700 FOR X=1 TO LEN(A$):Y=ASC(MID
$(A$,X,1)):DRAW A$(Y):NEXT:RETUR
N
```

Questions about specific BASIC programming problems can be addressed to BASICally Speaking, THE RAINBOW, P.O. Box 385, Prospect KY 40059.

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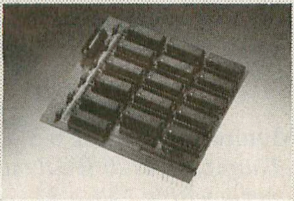

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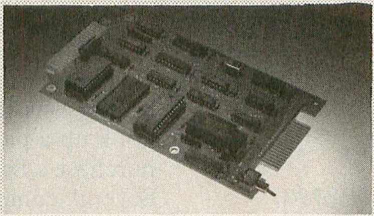

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COCO Q&A CONSULTATIONS

By Marty Goodman
Rainbow Contributing Editor

In this and in future "CoCo Consultations," I will be trying something new. In addition to the familiar Q & A column, I will also include tidbits of information contributed by various folks and, in some cases, comment on the information. Thus, even if you don't have a question, *I invite you to send in any little hints or descriptions of experiences you have had with the CoCo that you think might be of interest to the CoCo-owning public in general.*

A Fix for the *TW-80*

I noticed that the TW-80 *won't load anything other than ASCII text files. That is, it won't load an ASCII* BASIC *program. Here's the fix: Take a backup copy of your configured* TW-80 *disk, type* `LOADM"DISKMENU"` *and press* ENTER. *Now type* `PRINT HEX$(PEEK(&H2285))` *and press* ENTER. *You should get the number 27. Type* `PRINT HEX$(PEEK(&H249D))` *and press* ENTER. *You should get back the number 26. If you do not get back those numbers, you have a different version of* TW-80 *and should stop here. If you do get back those numbers, then type the following, pressing* ENTER *after each line:*

```
POKE &H2285, &H20
POKE &H249D, &H21
SAVEM"DISKMENU",&H2000,
&H381B,&H2000
```

This should fix the problem.

Mike Ward
(MIKEWARD)
Mikeyterm *author*
Coral Gables, FL

Martin H. Goodman, M.D., a physician trained in anesthesiology, is a longtime electronics tinkerer and outspoken commentator — sort of the Howard Cosell of the CoCo world. On Delphi, Marty is the SIGop of RAINBOW*'s CoCo SIG and database manager of OS-9 Online. His non-computer passions include running, mountaineering and outdoor photography. Marty lives in San Pablo, California.*

Printer Hookup

How does one hook a printer that has only a parallel ("Centronics") port to a Color Computer?

Edward Jr. Rosi, Jr.
Lake Park, FL

Color Computers normally hook to printers via their serial ports. Thus, to hook up a parallel printer, you need to purchase a Serial-to-Parallel Converter. Several companies advertise such devices in RAINBOW. They tend to cost about $50 with cables. If you are in an area that features computer swap meets, you may be able to get a deal on a high-quality Microfazer or other brand of converter that has a built-in printer buffer as well. Note that some of the less expensive converters often have problems operating properly at the higher (4800 and 9600) baud rates.

OS-9 users have another option. They can purchase a Disto parallel printer adapter device or a Disk Controller from J&M that has such a port built in. This port can then be used under OS-9 with supplied driver software. Unfortunately, it is far harder to use any of those ports with programs that run under Radio Shack Disk BASIC.

Showing the Colors

I have an RGB monitor that cannot show most of the CoCo 3's colors. It is the kind that has not only R, G and B inputs, but an I (intensity) input as well. How can I get it to show more colors on my CoCo 3?

Rick Weshenfelder
Pell Lake, WI

I'm afraid your monitor is one of the many that provide only for RGB digital-type (IBM CGA standard) input, not the analog capability required by the CoCo 3. There is no way to modify the CoCo 3 to make this monitor show more than the six colors plus black and white you are getting now. If you have a schematic for the monitor and a moderate understanding of video circuitry, it should be relatively easy to modify the monitor internally to provide it with an RGB analog input. Usually this involves removing the digital input circuitry and feeding the R, G and B signals directly into the bases of the transistors at the start of the analog RGB part of the monitor's insides. Sometimes some amount of biasing of the input signals is needed, too. However, I fear if you have to ask how to do it, you'd better not even try. Unless you're a fearless and knowledgeable electronics hacker, your only alternative is to buy another monitor that comes with RGB analog input capabilities.

Monitoring the CoCo 3

Will a Thompson 4120 RGB monitor work properly with a CoCo 3?

Bob Zukerman
(ELVIS2)
Jackson Heights, NY

The Thompson model 4120 monitor will accept analog RGB signals and will work properly with a CoCo 3 once you make up the proper custom video cable for it. The monitor also accepts composite video inputs, allowing you to view games in PMODE4 artifact colors — a nice plus. It also has the option of working with an IBM CGA-type video signal (digital RGB I-type video). Thus, it is a nice, flexible monitor.

On the negative side, its screen resolution is limited by a dot width of .51 mm. This is a bit coarse and, in my opinion, not quite acceptable for decently sharp 80-column display. Note that this is the same dot width as that used by Tandy's CM-8 monitor. The Thompson is excellent for displaying CoCo 3 graphics, but might be just a bit blurry when used to display 80-column text. Note also the Magnavox 8CM-515 monitor that I — and many others — frequently recommend has all the input flexibility of the Thompson but features a dot width of .41 mm, which results in a visibly sharper, crisper display of 80-column text. Magnavox 8CM-515s are available from a lot of RAINBOW advertisers, too. So unless you're getting an exceptional deal on the Thompson, I'd suggest you get a Magnavox instead.

Where's the Audio?

Where inside a CoCo 2 do I grab line level audio?

Roger Bouchard
(HARBIE)
Montreal, Que.

On all models of CoCo 2 you can find a line level audio signal on Pin 1 of the 20-pin custom DAC chip (often labeled SC77526P). I recommend grabbing the signal there, feeding it through a 1000-ohm resistor to attenuate it a bit and protect the CoCo sound circuit, then running a .022-mfd capacitor to ground from the other side of that resistor to act as a filter to reduce high-frequency hiss.

Board Population

Will it do any harm if I populate a CoCo 512K board with 15 120-ns NEC brand 41256 memory chips and one 150-ns NEC memory chip?

Aaron Wadkins
Kernersville, NC

I doubt you'll have any problem. Note that the speed rating on the chip specifies the *minimum* access time the chip will work at. The CoCo 3, in theory, demands chips that work at around 140-ns access time, but due to other, more subtle aspects of the timing in NEC chips, even those rated at 150-ns access time tend to work quite well in CoCo 3 memory upgrade boards.

Pin Compatibility

Is it true that the latest Radio Shack FD502 disk controllers now are using 28-pin ROMs that are pin-for-pin compatible with 2764-type EPROMs?

Art Flexser
(ARTFLEXSER)
ADOS author

It's true! It's true!

Beware of Cats Drinking Coffee!

I own a CoCo 3-type keyboard made by Tandy on which my cat spilled coffee. Now most of the keys no longer work. I tried to rinse it with alcohol, but this did not fix the problem. Can you save me the $30 that a new keyboard costs with any advice?

John Gordon
(TICTOC)
Woodside, NY

To have any chance of fixing that keyboard, you must open it up completely. This is a tedious matter, involving the removal of a couple of dozen tiny screws that hold the back metal plate on. Then you must very carefully remove the mylar sheet that constitutes the keyboard circuitry. Gently unfold this sheet, and clean it by soaking it in lukewarm water that has a small amount of liquid dishwashing detergent in it. Then rinse it off thoroughly with lukewarm water. Be careful not to scrub it, since that can remove the irreplaceable, flexible circuit material printed on the mylar. This approach allows the water to get to the area between the folds in the mylar, which is the critical contact area. It is possible that gentle wiping of the inner surfaces of the mylar and the printed circuit material on that mylar will help, but I'd again be *very* careful not to rub that printed circuit material off. Alcohol will not hurt the mylar, but be sure not to use acetone! Frankly, though, for coffee (and sugar and cream?), just plain detergent and water is probably best.

By the way, your question reminds me of one of the best and oldest Computer Repairperson jokes I've ever heard: "It says in the instructions for my computer that there is nothing I can enter into the keyboard that can harm the computer. The other day I entered a milkshake into the keyboard . . ."

Your technical questions are welcomed. Please address them to CoCo Consultations, THE RAINBOW, P.O. Box 385, Prospect, KY 40059.

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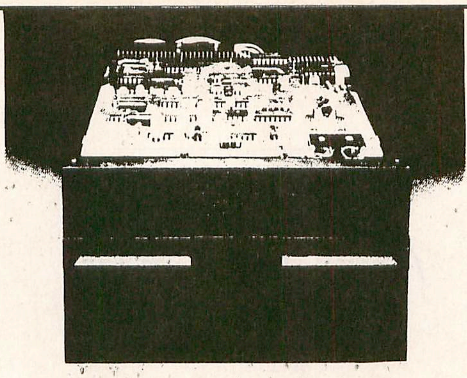

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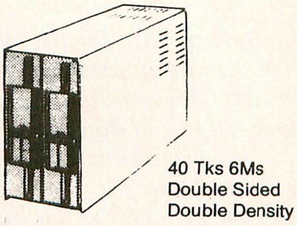

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If you have an idea for the "Wishing Well," submit it to Fred c/o THE RAINBOW. *Remember, keep your ideas specific, and don't forget this is* BASIC. *All programs resulting from your wishes are for your use, but remain the property of the author.*

A Concentration-like game for the entire family, based on last month's program, Opposites

Opposite Attraction

By Fred B. Scerbo
Rainbow Contributing Editor

Last month I introduced a lengthy BASIC listing called *Opposites*, which was designed to teach some basic vocabulary words and opposite concepts to younger, elementary-aged students. For months I have been promising you a real *game*, so this month we will incorporate the best features of last month's educational program with all the real elements of a game the whole family, ages 6 to 60, can play. The game is called *Match Game of Opposites*.

The Purpose

As you may recall, last month's program was designed to train younger students how to associate certain opposite concepts with pictures illustrating the action or object. When it came to the quiz part, however, the user needed only to match from three choices on the screen. In many cases this is easy, since the student might just match pictures. With repeated use the student eventually learns the words as well.

This new game, however, is designed to take those skills one step further, since up to 16 possible choices exist on the screen at one time. There is even an option that blocks out the graphics, so the student must play the game knowing only the words. In other words, even though this game can be played just for fun by all ages, it provides an educational value using the skills covered last month.

Playing the Game

You all remember the TV game show, *Concentration*. This game works on the same principle. There are 16 boxes on the screen. Two players are required for the game. Each takes a turn uncovering two boxes. If a match is discovered, the two boxes will be awarded to that player. The trick in this game, much like the TV show, is to remember where you saw a certain picture or word on the screen.

Unlike the TV show, however, you are not looking for identical matches. Instead, you are looking for opposites. Also, the TV show gives you another try if you get a match. This I have changed. Since there are only eight possible matches, a really lucky player might clear the board before the other player gets many tries. This ensures that the final score is not a total wipeout. (Since the last player gets the last match, even a loser scores some points. This is important when working with young students who might be upset at a wipeout.)

A flashing box surrounds each square. You may move the box with the arrow keys to make your selection. Pressing ENTER selects a box, and each player selects two. The boxes are then revealed. If a match occurs, they are awarded to the player (1 or 2). You may continue with game play by pressing the space bar.

When the screen is clear, pressing the space bar gives you the final score.

Since there are over 40 graphics in the program (the same as last month's), and only 16 are shown at one time, the game is never the same twice. There is enough of an assortment to keep it interesting.

That's all there is to it. As I mentioned, even adults will enjoy this game. Its greatest value is in the fact that an adult can play against a child. This offers one more opportunity for parent-child interaction, which is so valuable today.

Saving Some Time

If you typed in last month's program (*Opposite Concepts Vol. 1*), you may use some of the data from that program to save yourself some typing time. Here's what you do:

1. Load in last month's program.
2. Type `DEL 0-390` and press ENTER.
3. Type `DEL 795-` and press ENTER.
4. Delete lines:

400	500	600	700
410	510	610	710
420	520	620	720
430	530	630	730
440	540	640	740
450	550	650	750
460	560	660	760
470	570	670	770
480	580	680	780
490	590	690	790

(These are data lines containing information we do not need in this program. Simply type `DEL` followed by the line number and press ENTER to delete it.)

5. Type `RENUM 110,395,0` and press ENTER. This will renumber the lines to match the new program.
6. Important! Retype lines 190 and 195 as they appear in the new listing.

You are now ready to type in the rest of the program. This will save you some time if you went to the trouble of typing in last month's longer listing rather than buying RAINBOW ON TAPE or DISK.

Be sure to save this program with a different filename than last month's program, especially if you are using a disk.

An Error?

Since these `DATA` lines are quite long, if you are receiving this program on RAINBOW ON TAPE or DISK and resave the file in ASCII, be sure to check Line 165 [It's packed!]. Some of it may get chopped off in loading. The end of Line 165 should be `R12`, not `R1`. You may edit

---

Fred Scerbo is a special needs instructor for the North Adams Public Schools in North Adams, Massachusetts. He holds a master's in education and has published some of the first software available for the Color Computer through his software firm, Illustrated Memory Banks.

the correction into the line if it is missing. (This quirk only occurs if you resave the file in ASCII.) You may also need to make the same change in Line 505 in last month's program. This prevents the letter `T` in the word `RIGHT` from being chopped off.

If you are typing in the listing, you will notice that the cursor freezes before you reach the end of this "packed" line. At this point, go ahead and press `ENTER`. Then type `EDIT 165` and press X for extend. Type in the last few characters and press `ENTER`. [This technique of packing lines is not recommended, however.]

Conclusion

I think you will enjoy this game. Even if you do not have youngsters, you will find that the game can be a great deal of fun, especially if you try it without the graphics clues. (Then it is really tough!)

Next month we will continue with another installment in this series: a tutorial on using the `MERGE` command with our listings. Until then, keep your ideas coming in. ☐

40	36	260	191
90	180	290	92
135	62	335	96
160	159	415	13
190	135	500	209
210	105	570	70
235	42	END	213

The listing: `MATCH`

```
1 REM****************************
2 REM* MATCH GAME OF OPPOSITES  *
3 REM*   COPYRIGHT (C) 1988     *
4 REM*     BY FRED B. SCERBO    *
5 REM*    60 HARDING AVENUE     *
6 REM*  NORTH ADAMS, MA 01247   *
7 REM****************************
8 PCLEAR8
9 CLEAR3000
10 CLS0:PRINTSTRING$(64,220);:FO
RI=1TO256:READA:PRINTCHR$(A+128)
;:NEXT:PRINTSTRING$(64,211);
15 DATA46,46,42,46,44,42,46,46,4
2,46,45,36,42,37,40,101,108,108,
101,108,109,101,109,109,101,108,
108,53,60,58,48,48
20 DATA42,42,42,43,35,42,,42,,42
,,,43,39,,101,,99,101,99,103,101
,101,101,101,99,99,53,51,58,51,5
1
25 DATA42,,42,42,32,42,,42,,42,3
3,,42,37,,101,,101,101,,101,101,
,101,101,,,48,,,59,51
```

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```
30 DATA40,,40,40,,40,36,44,,44,4
4,36,40,36,40,100,108,108,100,,1
00,100,,100,100,108,108,,,,56,
35 DATA126,124,124,125,117,124,1
24,122,126,124,125,117,124,124,1
25,117,124,124,124,116,126,117,1
24,126,125,117,124,124,117,124,1
24,124
40 DATA122,,,117,117,115,115,122
,123,115,119,117,,,117,117,115,1
15,115,,122,,,122,,117,115,114,1
17,115,115,115
45 DATA122,,,117,117,,,,122,,,11
7,,,117,,,,117,,122,,,122,,117,,
,,,,117
50 DATA124,124,124,124,116,,,32,
120,,,116,124,124,124,116,124,12
4,124,116,124,,116,124,,116,124,
124,116,124,124,124
55 PRINT@422," BY FRED B.SCERBO
 ";:PRINT@454," COPYRIGHT (C) 1
988 ";:PRINT@486," GRAPHICS (Y O
R N)? ";
60 X$=INKEY$:X=RND(-TIMER):IFX$=
""THEN60
65 IFX$="Y"THEN GR=1:GOTO80
70 IFX$="N"THEN GR=0:GOTO80
75 GOTO60
80 DIM SC(2),M(2),HH(2),VV(2),H(
4),V(4),K$(4,4),K(4,4,2),P$(40),
P(16),B$(20),C$(20),A(20),N(40),
B(4),C(4),D(4),E(4),F(4),AO(20)
85 FORI=1TO40:READP$(I):NEXT
90 COLOR1,0:P$(16)=P$(15):P$(15)
=P$(15)+"BU28BR4F6NU16NE6U2NH4NE
4BD38BL6NR10D4NR10D6BR18NU10BR8U
10R10D4L10R4F6BR6R10U6L10U4R10BR
6R6ND10R6"
95 P$(16)=P$(16)+"BU24BR74F6NU16
NE6U2NH4NE4BD44BL74NU10R8BR6U6NR
10U4R10D10BR6R10U6L10U4R10BR6R6N
D10R6"
100 CLS0
105 GOTO315
110 DATA"BR60BD4F20L10D24L20U24L
10E20BD52BL14D10R10U10BR8ND10R10
D6L10"
115 DATA"BR60BD4L10D24L10F20E20L
10U24L10BD52BL32R4ND10R10D10L14B
R20U10R10D10NL10BR6NU10R6NU8R6NU
10BR6U10F10U10"
120 DATA"BR16BD20R80M-4,+20L36M-
4,-18NL36BR12BU4E4UH4UE4BR10G4DF
4DG4BR10E4UH4UE4BD50BL50D10U6R10
U4D10BR8U10R10D10NL10BR12U10L6R1
2"
125 DATA"BR60BD20L4ND6L6ND2L4ND4
L2M+16,+32M+16,-32L16R4ND8R6ND4R
6L2U4H2U2H2L2H2L12G2L2G2D2G2D4BD
36BL10L10D10R10BR8U10R10D10NL10B
R8NU10R10BR6R14U10L14R4D10"
130 DATA"BR10BD14R26F4D16G4L22NU
24D24L4R26E4U16H4BR12U24NL4NR4D4
8NL4R4BR10H4U40E4R16F4D10BD10NL1
6D20G4L14BR24R4U30R4U10R2U10E2U6
RD6F2D10R2D10R4D30R4L22BR8BU2U24
BR4D24"
135 DATA"BR38BD56D8R4BR4U8BR4R2N
D8R2BR4R2ND8R2BR4D8R4BR4NR4U4NR4
U4NR4BU6BL6H4L4U2NR4D2L4NUND4L4U
2L4D2R4NH6L2G4"
140 DATA"BR24BD36E12G6F20R20E20F
6H12BL14H2G4L4H4G2BU10BL4NU4L2U6
E4R2BR26L2G4D6L2U4BD56BL46U10D4R
10U4D10BR6U10NR10D4R10U4D10BR6U1
0R10D4L10D6BR16U10R10D4L10BR18BD
6U6NH4NE4"
145 DATA"BR34BD50H12F6E12R36F12G
6E12BU16BL28H2G4L4H4G2BU10BL4NU4
L2U6E4R2BR26L2G4D6L2U4BD58BL34R1
0U6L10U4R10BR6NR10D4NR10D6BR10NU
10BR6R4U10L4R14D10L10"
150 DATA"BR20BD22D20M+30,+10NU20
R50U20NL50M-30,-10ND8L50M+30,+10
M-30,-10E20R50G20L10NE20L10NE20L
10NE20L10NE20BD34BR6NR10D10R10NU
10BR6U10R6D4L6D6BR12NR6U6NR6U4R6
BR6ND10F10U10"
155 DATA"BR12BD16D20M+30,+10NU20
R60U20NL60M-30,-10L60M+30,+10R12
M-30,-10R12M+30,+10R12M-30,-10R1
2M+30,+10BD40BL78NR10U10R10BD10B
R6NU10R8BR6U10R10D10NL10BR6R10U6
L10U4R10BR6NR6D4NR6D6R6BR6R4NU10
R10U10L14"
160 DATA"BR90BD52U2E8U32H4L4G2D1
0F2R4E4BL12U12H4L4G4D12F4R4E4BL1
2U12H4L4G4D12F4R4E4BL12U12H4L4G4
D12F4R4E4BL12D2G4L4M-10,-6M-10,-
2L2G4D4M+8,+4D2M+20,+12F10M+6,+2
F2BE10H10M-8,-3BD36BL20NU10R10BR
6NR8U6NR8U4R8BR6NR10D4NR10D6BR22
U10L6R12"
165 DATA"BR28BD52U2H8U32E4R4F2D1
0G2L4H4BR12U12E4R4F4D12G4L4H4BR1
2U12E4R4F4D12G4L4H4BR12U12E4R4F4
D12G4L4H4BR12D2F4R4M+10,-6M+10,-
2R2F4D4M-8,+4D2M-20,+12G14G2BH10
E10M+8,-3BD24BL40ND10R10D4L10R4F
6BR6NU10BR6U10NR10D10R10U6NL4BR6
NU4ND6R10U4D10BR10U10L6R12"
170 DATA"BR30BD6D34R4E2U10R12F4R
12E4R12F4D12R10U20H8L18H4L4U8R12
U4L28D4R12D8L4G4L12U8H2L4BM+60,+
40F4D4G2L4H2U4E4BL54BD10D10R6NU8
R6NU10BR6NR8U6NR8U4R8BR6R6ND10R6
"
175 DATA"BR30BD6D34R4E2U10R12F4R
12E4R12F4D12R10U20H8L18H4L4U8R12
U4L28D4R12D8L4G4L12U8H2L4BD50BR8
R4ND10R10D10NL14BR6U10R10D4L10R4
F6BR10U6NH4E4"
```

```
180 DATA"BR10BD40R102L8E10M-8,+4
L6U4H2L2G4R4D4F4L20E10M-8,+4L6U4
H2L2G4R4D4F4L20E10M-8,+4L6U4H2L2
G4R4D4F4L20E20M-16,+8L12U8H4L4G8
R8BE4NLBG4D8F8"
185 DATA BR2
190 DATA"BR56BD26M+18,+5F8LH2L2G
2H2L2G2H2L2G2H2L2G3D11GLNHREU11H
3L2G2H2L2G2H2L2G2H2L2G2E8M+18,-5
BU10R10E4NH4R6E4U2H4L10G4L12NG4H
6L8G4D6F4R6F4R4E2R2R6R4BR16NE6NR
20NF6BD50BL50U10R10D10NL10BR6BU4
NU6F4E4U6BR6NR10D4NR10D6R10BR6U1
0R8D4L6F6"
195 DATA"BR56BD2M+18,+5F8LH2L2G2
H2L2G2H2L2G2H2L2G3D9GLNHREU9H3L2
G2H2L2G2H2L2G2H2L2G2E8M+18,-5BD3
6NE6NH6NG6NF6BR16NE6NF6R22BD28BL
74NU10R10NU10BR6U10F10NU10BR6R4U
10L4R14D10NL10BR6NR10U6NR10U4R10
BR6ND10R8D4L8R2F6"
200 DATA"BR16BD20E2NR80R16E8R6NG
4R6NG4R6NG4R6NG4R6NG4R6NG4NG4R6N
G4R6NG4R6NG4R6NG4F8D2G8NH4L6NH4L
6NH4L6NH4L6NH4L6NH4L6NH4L6NH4L6N
H4L6NH4L6H8L16NR80BD46BR10NU10R8
BR6NU10BR6U10R10BD4NL4D6NL10BR6U
6NU4R10U4D10BR12U10L6R12"
205 DATA"BR26BD46R68M-14,-30L10U
6H4L12G4D6L10M-14,+30BR18BU8U12B
R6NR6D12R6NU12BR6U12R6D12NL6BR4N
U6BR4NU6U4R4D4L4BU22BL14L4U4R4D4
BD50BL36U10D4R10U4D10BR6NR10U6NR
10U4R10BR6ND10R10D4NL10D6BR6BU4N
U6F4E4U6BR6F4ND6E4"
210 DATA"BR60BD48R8E4U10R4U6L4U6
H4L16G4D6L4D6R4D10F4R8BU6NE4NH4B
U8NLNR2BU6BL4NR2BR6R2BU16R6E2H2L
20G2F2R12BD20BL20H16D16F16R36E16
U16G16BD34BL50U10R10BD4NL4D6NL10
BR6U10R10D10NL10BR6U10R10D10NL10
BR6R4NR10U10L4R14D10"
215 DATA"BR60BD48R8E4U10R4U6L4U6
H4L16G4D6L4D6R4D10F4R8BU10NG4NF4
BU4NLNR2BU6BL4NR2BR6R2BU12E6D8L2
0U8F6BL20D6G4L6NU10ND20L6H4U6BR7
8NG4NF4D20G10BD20BL48U10R10D4NL1
0D6NL10BR6U6NR10U4R10D10BR6R4NR1
0U10L4R14D10"
220 DATA"BR20BD16D30NR56U30R6U16
R10F4G4L10D8R10D6R10D6R10D6R10D6
R10D6R26BU42BL30L20NE4NF4BD52BL2
0D10U6R10U4D10BR8NU10BR8NR10U10R
10BD4NL4D6BR6U10D4R10U4D10"
225 DATA"BR20BD16D30NR56U30R16D6
R10D6R10D6R10D6R10D6R26L16U16R10
F4G4L10D8BU26BR6NU16NH4NE4BD46BL
50NU10R8BR6U10R10D10NL10BR6NU10R
```

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```
6NU8R6U10"
230 DATA"BR32BD26NR50D2NR50D2R50
D6L2D4R14U4L2U12H2U4H2U2H4L6D2F2
D2F2D8BL50BD30D4ND6R10D6U10BR6ND
10R10D4NL10D6BR6U10R10D4L10R4F6B
R6R4NU10R10U10L14"
235 DATA"BR36BD18H8U8R8F8E4R20F4
E8R8D8G8D10G4D2G8L2G4L8H4L2H8U2H
4U10BR10BD4R4NU2ND2NR4NE2NH2BR12
R4NU2ND2NR4NE2NH2BG8BD4NE4NH4D6N
F4NG4U6BR6NR20BL12NL20BR6D4BF4NF
10BH4BG4G10BL14BD14R10U6L10U4R10
BR6ND10R10D10NL10BR6U6NR10U4R10B
R6R6ND10R6"
240 DATA"BR30BD2D10NR30D4NR30L2D
4L2D4L2D4L2D12NR88D6R8NU6R8NU6R8
NU6R8NU6R8NU6R8NU6R8NU6R8NU6R8NU
6R8NU6R8U6U4H4M-10,-4L4ND10M-30,
-10NU16NE6D4M+30,+10BL58ND8NH8BD
22BR16ND10R10D10NL10BR6U10F10U10
"
245 DATA"BR26BD2D14L2D4L2D4L2D4L
2D12F6R20E2R30F2R14E2F2R10E2U6H2
L10H2L8M-30,-10H4U18BL18BD20G4D4
F4BD20D10R10U10NL10BR6NR10D4NR10
D6BR16U6NR10U4R10"
250 DATA"BR20BD6ND20R80G10NL50M+
10,+30G4L62H4M+10,-30H4L8D14L6BD
30BR16NR10D4NR10D6BR16NU10R10NU1
0BR6NU10R8BR4NU10R8"
255 DATA"BR20BD6ND20R80G10M+10,+
30G4L62H4M+10,-30H4L8D14L6BD30NR
10D4NR10D6R10BR6U10R6ND6R6D10BR6
U10R10D4NL10BR6BU4R6ND10R6BR6F4N
D6E4"
260 DATA"BR50BD14ND20R12D10NL12N
D10BR8R6NU6ND6R6BR10U18L60D36R60
U18BD30BL60NL4ND10R10D4NL10D6NL1
4BR6NR10U6NR10U4R10BR6BD10R10U6L
10U4R10BR6R6ND10R6"
265 DATA"BR50BD14ND20R12BD10NL12
BR8R12BR10U18L60D36R60U18BD30BL7
0D10R6NU8R6U10BR6ND10R10D10NL10B
R6U10R10D4L10R4F6BR6R10U6L10U4R1
0BR6R6ND10R6"
270 DATA"BR30BD4ND6R60D6NL60D4L6
0NU4G4D28F4R60E4U28H4BL20BD32H4L
4U2NR4D2L4NUND4L4U2L4D2R4NH6L2G4
BD10BL26ND10BR6ND10F10U10BR6BD10
R10U6L10U4R10BR6ND10BR6R4ND10R10
D10NL14BR6NR10U6NR10U4R10"
275 DATA"BR12BD4ND6R60D6NL60D4L6
0NU4G4D28F4R60E4U28H4BR36BD32H4L
4U2NR4D2L4NUND4L4U2L4D2R4NH6L2G4
BD10BL76ND10R10D10NL10BR6NU10R10
U10BR6R6ND10R6BR6BD10R10U6L10U4R
10BR6ND10BR6R4ND10R10D10NL14BR6N
R8U6NR8U4R8"
280 DATA"BR16BD30NR30U2NR30U2R18
BR4R2BR4R2BL30U2R90G12M-48,+4U10
BD36BL22R10U6L10U4R10BR6D10U6R10
U4D10BR6U10R10D4NL10D6BR6U10R10D
4L10R4F6BR6U10R10D4L10"
285 DATA"BR16BD30NR40H2U4E2R40ND
8R48F2D2G2L2G2L2G2L36H2BD36BL28R
4NU10R10U10NL14BR6D10R10U10BR6D1
0R8BR6NU10R8"
290 DATA"BR22BD6R30D6F4R8E4U6R30
D16L8NU16L8D26L22NU30L22U26L8NU1
6L8U16BD60NR10U10R10BR6D10R8BR6N
R10U6NR10U4R10BR6ND10R10D4NL10D6
BR6U10F10U10"
295 DATA"BR22BD6R30D6F4R8E4U6R30
D16L8NU16L8D26L8NU12L4NU20L2NU8L
4NU6L4NU30L8NU12L4NU20L2NU8L4NU6
L2NU18L2U26L8NU16L8U16BD50R4ND10
R10D10NL14BR8NU10BR8U10R10D4L10R
4F6BR6BU10R6ND10R6BR6F4ND6E4"
300 DATA"BR20BD30NR84BD36BL6R10U
6L10U4R10BR6ND10R6ND8R6D10BR6U10
R10D10NL10BR6U10R10D10NL10BR6BU1
0R6ND10R6BR6D10U6R10U4D10"
305 DATA"BR14BD30BRE4R4F4R4E4R4F
4R4E4R4F4R4E4R4F4R4E4R4F4R4E4R4F
4BL84BD36U10R10D4L10R4F6BR6U10R1
0D10NL10BR6NU10R10NU10BR6U10R10B
D4NL4D6NL10BR6U10D4R10U4D10"
310 DIMK$(4,4),K(4,4,2),P$(40)
315 PMODE4,1:PCLS0:SCREEN0,0:CLS
0:PRINT@263," PLEASE STAND BY ";
320 PT$(1)="NG4D10NL4NR4":PT$(2)
="BL4ND2R6D4L6D6R6":PL=2
325 FORY=4TO250STEP63:YY=YY+1
330 H(YY)=Y
335 II=0:FORI=2TO148STEP44:II=II
+1:V(II)=I:LINE(Y,I)-(Y+58,I+40)
,PSET,BF:K$(YY,II)="BM"+STR$(Y)+
","+STR$(I):NEXTI,Y
340 POKE178,0:COLOR1,0:LINE(0,17
8)-(256,192),PSET,BF
345 CR$="S4C0R58D40L58U40C1R58D4
0L58U40"
350 COLOR1,0:FORI=1TO4:FORY=1TO4
:FORQ=0TO20STEP2:LINE(H(I)+Q,V(Y
)+Q)-(H(I)+58-Q,V(Y)+40-Q),PRESE
T,B:NEXTQ,Y,I
355 FORI=1TO4:FORY=1TO4:DRAWK$(I
,Y)+CR$:NEXTY,I
360 FORI=1TO40:N(I)=0:NEXTI
365 FORI=1TO8
370 P(I)=RND(20)*2:IFN(P(I))=1TH
EN370
375 N(P(I))=1:NEXTI
380 FORI=1TO8:P(I+8)=P(I)-1:NEXT
I
385 FORI=1TO40:N(I)=0:NEXTI
390 FORI=1TO4:FORY=1TO4
395 K(I,Y,1)=RND(16):IFN(K(I,Y,1
))=1THEN395
400 N(K(I,Y,1))=1:NEXTY,I
```

```
405 FORI=1TO4:FORY=1TO4:K(I,Y,1)
=P(K(I,Y,1)):NEXTY,I
410 REM:FORI=1TO4:FORY=1TO4:DRAW
K$(I,Y)+"BD4C0S2":DRAWP$(K(I,Y,1
)):NEXTY,I
415 DRAW"C0BM76,190S4U8R10D4NL10
BR6U4D8R8BR6U8R10D4NL10D4BR10U4N
H4E4BR4NR10D4NR10D4R10BR6U8R10D4
L10R6F4"
420 SCREEN1,1:IFPL=2THENPL=1ELSE
IFPL=1THENPL=2
425 IF SC(1)+SC(2)=16THEN585
430 COLOR1,0:LINE(170,180)-(182,
192),PSET,BF
435 IFPL=1THENDRAW"BM174,190S4C0
R8L4U8G2"ELSEIFPL=2THENDRAW"BM17
4,190S4C0NR8U4R8U4L8D2"
440 V=1:H=1:FOR TR=1TO2
445 DRAWK$(H,V):DRAWCR$
450 X$=INKEY$:IFX$=""THEN445
455 IFX$=CHR$(13)THEN500
460 P=ASC(X$)
465 IFP=8THENH=H-1
470 IFP=9THENH=H+1
475 IFH=0THENH=1:GOTO445:ELSEIFH
=5THENH=4:GOTO445
480 IFP=94THENV=V-1
485 IFP=10THENV=V+1
490 IFV=0THENV=1:GOTO445ELSEIFV=
5THENV=4:GOTO445
495 GOTO445
500 IFK(H,V,2)<>0THEN445
505 COLOR1,0:LINE(H(H),V(V))-(H(
H)+58,V(V)+40),PSET,BF
510 FORI=1TO4:PCOPY I TO I+4:NEX
T:PMODE4,5
515 DRAWK$(H,V)+"BD4C0S2":DRAWP$
(K(H,V,1)):K(H,V,2)=-1:IF GR=1TH
EN525
520 COLOR1,0:LINE(H(H),V(V))-(H(
H)+58,V(V)+30),PSET,BF
525 FORI=1TO4:PCOPY I+4 TO I:NEX
T:PMODE4,1:SCREEN1,1
530 M(TR)=K(H,V,1)
535 HH(TR)=H:VV(TR)=V
540 NEXT TR
545 IFINT(((M(1)/2)+.5))<>INT(((
M(2)/2)+.5))THEN555
550 FORI=1TO2:DRAWK$(HH(I),VV(I)
)+"BD8C0S2":DRAWP$(K(HH(I),VV(I)
,1)):NEXTI
555 IFINKEY$<>CHR$(32)THEN555
560 COLOR1,0:FORI=1TO2:LINE(H(HH
(I)),V(VV(I)))-(H(HH(I))+58,V(VV
(I))+40),PSET,BF:NEXTI
565 IFINT(((M(1)/2)+.5))<>INT(((
M(2)/2)+.5))THEN580
570 COLOR1,0:FORI=1TO2:FORQ=0TO2
8STEP2:LINE(H(HH(I))+Q,V(VV(I))+
Q)-(H(HH(I))+58-Q,V(VV(I))+40-Q)
,PRESET,B:NEXTQ:LINE(H(HH(I))+Q-
8,V(VV(I))+Q)-(H(HH(I))+58-Q+8,V
(VV(I))+40-Q),PRESET,BF:NEXTI
575 FORQ=1TO2:DRAWK$(HH(Q),VV(Q)
)+"S4BR30BD14C1":DRAW PT$(PL):NE
XTQ:SC(PL)=SC(PL)+2:GOTO420
580 FORZ=1TO2:K(HH(Z),VV(Z),2)=0
:NEXTZ:COLOR1,0:FORI=1TO2:FORQ=0
TO20STEP2:LINE(H(HH(I))+Q,V(VV(I
))+Q)-(H(HH(I))+58-Q,V(VV(I))+40
-Q),PRESET,B:NEXTQ,I:GOTO420
585 FORI=1TO2000:NEXT
590 CLS:PRINT@104,"FINAL SCORECA
RD"
595 PRINT@168,"PLAYER ONE =";SC(
1)
600 PRINT@232,"PLAYER TWO =";SC(
2)
605 PRINT@296,"PLAYER ";:IFSC(1)
>SC(2)THENPRINT"ONE WINS!";ELSEI
FSC(2)>SC(1)THENPRINT"TWO WINS!"
610 IFSC(1)=SC(2)THENPRINT@296,"
THE GAME IS TIED!"
615 PRINT@360,"ANOTHER TRY (Y/N)
?";
620 X$=INKEY$:IFX$="Y"THENRUNELS
EIFX$="N"THENCLS:END:ELSE620
```

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The third in a series of tutorials for the beginner to intermediate machine language programmer

Machine Language Made BASIC

Part III: What a Dump!

By William P. Nee

Dumps are simply programs that transfer images from the screen to paper by way of a printer. The programs shown in Listings 1 and 2 are for a seven-dot printer that adds 128 to the total value of the dots used for graphic printing. Listing 1 is the BASIC version and Listing 2 is a machine language version.The seven dots in a column have a value of 1, 2, 4, 8, 16, 32, and 64, starting from the top. The values of the dots you want to print are added together and then added to 128. The total value is sent to the printer as a `CHR$` value. Printer commands used in this program are:

`CHR$(18)` - set for graphics
`CHR$(27)`; `CHR$(16)` - position the print head
`CHR$(0)`; `CHR$(50)` - 50 spaces over
`CHR$(30)` - end graphics mode

Check your printer manual for any changes to these `CHR$`.

Location `$6F` tells the computer which device will display or receive information as follows:

$6F	Device
`-2(#$FE)`	printer
`-1(#$FF)`	tape recorder
`0`	screen
`1 - 15`	disk

Locations `$BA` and `BB` give the location of beginning graphics — usually at `$600`, or `$E00` with disk.

The `BIT` command is a quick way to test each bit in a byte and branch accordingly. We will check each bit to see if it is a zero, and we'll branch if it is. The `BIT` command `AND`s a number in registers A or B with any other number you select; but unlike the `AND` command, the number in registers A or B remains unchanged — only the values of the condition codes (CC) register are affected. The CC register is the register to which all branches look to see if the conditions for a branch have been met (plus, minus, equal, zero, etc.). The rules for `AND` are:

0 `AND` 0 = 0
0 `AND` 1 = 0
1 `AND` 0 = 0
1 `AND` 1 = 1

Another way to think of this is: any number `AND` 0 = 0, any number `AND` 1 = the same number.

Now, how do we test the left bit (Bit 7) in Register A to see if it is a 0 or a 1? We must `BITA` with the number 128. This is easier to see when written in the binary format (Base 2):

let Register A = 149 = 10010101
`BITA` with #128 = 10000000
CC register = 10000000

Since the result is not 0, the CC register will not be set to 0 and a `BEQ` (Branch if EQual to 0) will not execute, so the program will continue with its next command. If you continue to `BITA` with 64, 32, 16, 8, 4, 2 and 1, you can check each bit and branch accordingly.

Since the printer can type a column seven bytes high, this program will look at the left bit in each of the seven stacked bytes, then the next bit over, and the next, etc., until reaching the right bit (Bit 0).

If a bit is 1, the value of the `CHR$` to be printed is increased by the dot's value according to its location in the column:

Dot	Value
1	1
2	2
3	4
4	8
5	16
6	32
7	64

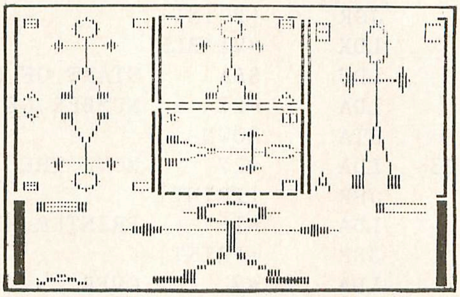
Bill Nee bucked the "snowbird" trend by retiring to Wisconsin from a banking career in Florida. He spends the long, cold winters writing programs for his CoCo.

Finally, 128 is added to the total value and the result is sent to the printer as a `CHR$` (value). The routine at `$A002` sends the value in Register A to whatever device is indicated by Location `$6F`. The brackets around `PRINT` in the program mean to use the values in `$A002` and `$A003` as the `JSR` address. Those values may differ in various Color Computer models, but the `$A002` should remain the same.

The end of the program uses `CLR $6F` to set Location `$6F` to 0, the device number for the screen. `CLR` is the fastest command available to set any memory byte or single-byte register such as A, B or CC to 0. `CLRA` executes more quickly and uses less memory than `LDA #0`.

In one portion of the program we used `LBNE` (Long Branch if Not Equal) instead of `BNE`. This is because a regular Branch can only move backward -128 spaces or forward +127 spaces (remember "signed" numbers?); a Long Branch can branch anywhere in the program but consumes a little more memory. Use the regular branch whenever possible; *EDTASM+* will let you know if a Long Branch is necessary. It *is* good, though, to use `JSR` when referring to ROM routines.

The BASIC program for the "dump" takes advantage of the BASIC `PPOINT` command to see if each bit in the seven-byte column is set or not. If it is set, the value of the `CHR$` is increased and 128 is added to the total value. The resulting character is sent to the printer.



Sample printout using a Radio Shack DMP-105

The `PPOINT` method could have been used in the machine language program, but it is still a slow command. We will, however, use this command in future articles to write programs involving graphics.

Both programs will run for a while without printing anything since the printer buffer must be filled before printing. The buffer stores what the computer has been sending it until ready. Then it prints it all at once, rather than printing out one `CHR$` at a time. Both programs also skip printing the bottom three lines of graphics. You can add your own routines if you want them. Be sure to clear space before running the machine language program from BASIC: `CLEAR 200, &H3000-1`.

The time difference between the two programs is amazing. The BASIC program can take up to twenty minutes to copy a graphics page, while the machine language program can do the job in about three minutes. It's a longer program, but if you're doing a lot of repetitious dumping (Christmas cards, for example) it is quite a time-saver. The machine language program is designed for `PMODE 4`, since we're not using a color printer.

Try experimenting with a program that dumps from top to bottom of the page rather than from left to right. This prints the picture sideways but allows you to double its size. You might also try to reverse the picture.

(Questions or comments concerning this tutorial may be addressed to the author at Route 2, Box 216C, Mason, WI 54856-9302. Please enclose an SASE when requesting a reply.) ☐

Listing 1: DUMPBAS

```
10 CLEAR200,&H3000-1
20 'SAMPLE GRAPHICS PROGRAM
30 PMODE 4,1:PCLS5:SCREEN1,1
40 FOR X=0 TO 254 STEP 2
50 LINE(X,0)-(255-X,191),PRESET
60 NEXT
70 FOR Y=190 TO 0 STEP -2
80 LINE(0,Y)-(255,191-Y),PRESET
90 NEXT
100 DRAW"C5BM80,60M+6,+10E5F5M+6
,-10BR6D5ND5R18NU5D5BR6E10F6NL12
F4BR16U10NL10R10"
110 DRAW"BM120,100E10F6NL12F4"
120 DRAW"BM80,130U10R18F2D6G2NL1
8BR8BU2NU8F2R14E2U8BD10BR6M+6,-1
0F5E5M+6,+10BR6U10R18F2D3G2L18"
130 'THE DUMP PROGRAM
140 'EXEC &H3000 OR -
150 PRINT#-2,CHR$(18)
160 FOR V=0 TO 182 STEP 7
170 PRINT#-2,CHR$(27);CHR$(16);C
HR$(0);CHR$(50);
180 FOR H=0 TO 255:P=0
190 FOR N=0 TO 6
200 IF PPOINT(H,V+N)<>0 THEN P=P
+2^N
210 NEXT N
220 PRINT#-2,CHR$(P+128);:NEXT H
230 PRINT#-2:NEXT V
240 PRINT#-2,CHR$(30)
```

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Listing 2: DUMPBIN

```
3000                00100         ORG    $3000
          A002      00110 PRINT   EQU    $A002      PRINT ROUTINE
3000 86   FE        00120 START   LDA    #-2        USING THE PRINTER
3002 97   6F        00130         STA    $6F
3004 86   12        00150         LDA    #18        TEXT TO GRAPHICS
3006 AD   9F A002   00160         JSR    [PRINT]
300A 8E   30CC      00170         LDX    #VTABLE
300D DE   BA        00180         LDU    $BA        START OF GRAPHICS
300F 86   1B        00190         LDA    #27        NUMBER OF ROWS
3011 B7   30CA      00200         STA    DOWN
3014 86   1B        00210 LOOP3   LDA    #27        MOVE THE
3016 AD   9F A002   00220         JSR    [PRINT]
301A 86   10        00230         LDA    #16        PRINTER HEAD
301C AD   9F A002   00240         JSR    [PRINT]
3020 86   00        00250         LDA    #0         OVER
3022 AD   9F A002   00260         JSR    [PRINT]
3026 86   32        00270         LDA    #50        50 SPACES
3028 AD   9F A002   00280         JSR    [PRINT]
302C 86   20        00290         LDA    #32        BYTES PER LINE
302E B7   30C9      00300         STA    ROW
3031 C6   08        00310 LOOP2   LDB    #8         BITS PER BYTE
3033 7F   30CB      00320 LOOP1   CLR    VALUE
3036 A6   40        00330         LDA    0,U        FIRST BIT IN THE COLUMN
3038 A5   85        00340         BITA   B,X        AND A WITH B,X
303A 27   03        00350         BEQ    NEXT2
303C 7C   30CB      00360         INC    VALUE
303F A6   C8 20     00370 NEXT2   LDA    32,U       SECOND BIT IN THE COLUMN
3042 A5   85        00380         BITA   B,X        AND A WITH B,X
3044 27   08        00390         BEQ    NEXT3
3046 B6   30CB      00400         LDA    VALUE
3049 8B   02        00410         ADDA   #2
304B B7   30CB      00420         STA    VALUE
304E A6   C8 40     00430 NEXT3   LDA    64,U       THIRD BIT IN THE COLUMN
3051 A5   85        00440         BITA   B,X        AND A WITH B,X
3053 27   08        00450         BEQ    NEXT4
3055 B6   30CB      00460         LDA    VALUE
3058 8B   04        00470         ADDA   #4
305A B7   30CB      00480         STA    VALUE
305D A6   C8 60     00490 NEXT4   LDA    96,U       FOURTH BIT IN THE COLUMN
3060 A5   85        00500         BITA   B,X        AND A WITH B,X
3062 27   08        00510         BEQ    NEXT5
3064 B6   30CB      00520         LDA    VALUE
3067 8B   08        00530         ADDA   #8
3069 B7   30CB      00540         STA    VALUE
306C A6   C9 0080   00550 NEXT5   LDA    128,U      FIFTH BIT IN THE COLUMN
3070 A5   85        00560         BITA   B,X        AND A WITH B,X
3072 27   08        00570         BEQ    NEXT6
3074 B6   30CB      00580         LDA    VALUE
3077 8B   10        00590         ADDA   #16
3079 B7   30CB      00600         STA    VALUE
307C A6   C9 00A0   00610 NEXT6   LDA    160,U      SIXTH BIT IN THE COLUMN
3080 A5   85        00620         BITA   B,X        AND A WITH B,X
3082 27   08        00630         BEQ    NEXT7
3084 B6   30CB      00640         LDA    VALUE
3087 8B   20        00650         ADDA   #32
3089 B7   30CB      00660         STA    VALUE
308C A6   C9 00C0   00670 NEXT7   LDA    192,U      SEVENTH BIT IN THE COLUMN
3090 A5   85        00680         BITA   B,X        AND A WITH B,X
3092 27   08        00690         BEQ    PRNT
3094 B6   30CB      00700         LDA    VALUE
3097 8B   40        00710         ADDA   #64
```

```
3099 B7    30CB      00720         STA     VALUE
309C B6    30CB      00730 PRNT    LDA     VALUE
309F 8B    80        00740         ADDA    #128     FILL IN THE EIGHTH BIT
30A1 AD    9F A002   00750         JSR     [PRINT]
30A5 5A              00760         DECB
30A6 26    8B        00770         BNE     LOOP1    FINISHED THE BYTE?
30A8 33    41        00780         LEAU    1,U      MOVE OVER TO THE NEXT BYTE
30AA 7A    30C9      00790         DEC     ROW      FINISHED THE ROW YET?
30AD 26    82        00800         BNE     LOOP2
30AF 86    0A        00810         LDA     #10      CARRIAGE RETURN
30B1 AD    9F A002   00820         JSR     [PRINT]
30B5 33    C9 00C0   00830         LEAU    192,U    SKIP DOWN 7 ROWS
30B9 7A    30CA      00840         DEC     DOWN
30BC 1026  FF54      00850         LBNE    LOOP3
30C0 86    1E        00860 FIN     LDA     #30      BACK TO TEXT
30C2 AD    9F A002   00870         JSR     [PRINT]
30C6 0F    6F        00880         CLR     $6F      BACK TO THE SCREEN
30C8 39              00890         RTS              BACK TO BASIC
30C9                 00900 ROW     RMB     1
30CA                 00910 DOWN    RMB     1
30CB                 00920 VALUE   RMB     1
30CC       0001      00930 VTABLE  FDB     $0001
30CE       0204      00940         FDB     $0204
30D0       0810      00950         FDB     $0810
30D2       2040      00960         FDB     $2040
30D4       80        00970         FCB     $80
           3000      00980         END     START

00000 TOTAL ERRORS
```

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Reviewed Sept. 1986 pg 141 April 1987 pg 140

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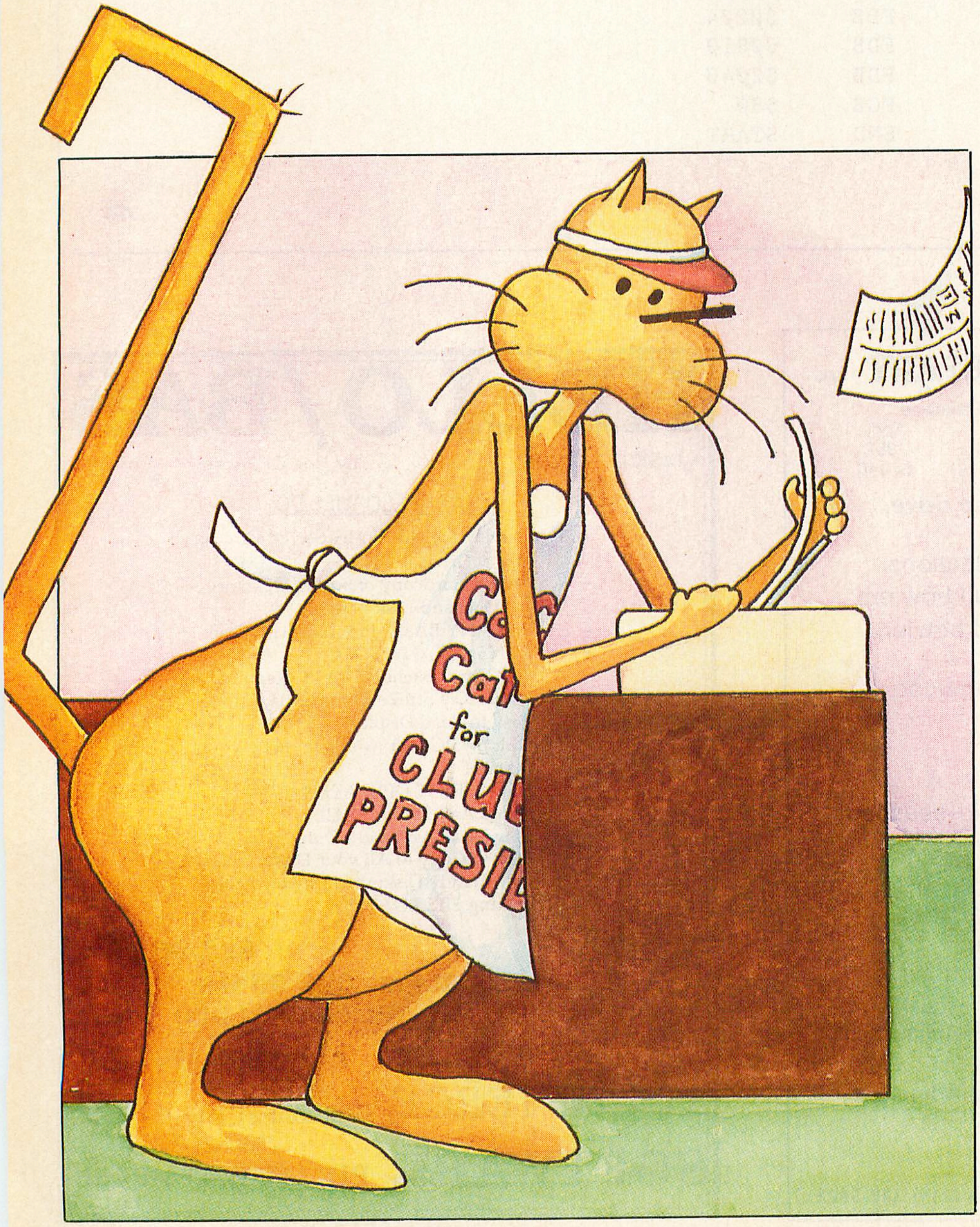
The Desktop Publisher: A Reprise

By H. Allen Curtis



I first ventured into desktop publishing with "A Desktop Publisher on a Shoestring," (October '87, Page 58). The article met with success well beyond my expectations.

Through the hundreds of letters I received about my article, I was able to meet some truly fine people. Many readers sent me beautifully executed sample documents and told of their intended uses for the publisher: newsletters, business advertising, greeting cards, special school projects, classroom aid, improvement of student writing skills, etc. Those letters provided the motivations for my continuing attempts to enhance the desktop publisher and to write this article.

Many personal and home computer owners prize word processors as one of their most valuable software pieces. The designers of the leading, more expensive ($300 to $500) desktop publishers are aware of this and have enabled their programs to enter files from word processors. Thus, at the initial stage of desktop publishing, users of such desktop publishers have the convenience of composing and editing their texts on their favorite word processors. This

---

H. Allen Curtis lives in Williamsburg, Virginia. He is interested in 17th and 18th century history and enjoys biking through the colonial capital. He balances past and present with his computer work.

article brings a similar capability to the shoestring desktop publisher programs, *Desktop Low* for the CoCos 1 and 2 and *Desktop High* for CoCo 3. Whether or not you use a word processor, you can benefit from the information contained in this article.

To accommodate the addition of the word processor input feature to *Desktop Low* and *Desktop High*, more program memory must be made available. All lines of BASIC involved in drawing the font menu for the files DESKTOPL and DESKTOPH can be deleted if that information is stored in a disk file and brought in serially whenever a new font is selected. Deletion of those lines of BASIC would provide a significant savings of program memory. Furthermore, if one font menu can be stored on disk and loaded into the computer on demand, the same can be done with other font menus. This allows an increase in the number of available fonts. In fact, I have developed a supplementary set of nine new fonts, so that there are 19 fonts now available. An explanation of how you can obtain the extra font set is given at the conclusion of this article.

The GENMENU program shown in Listing 1 will be employed in drawing the present DESKTOPL and DESKTOPH font menus. After carefully typing Listing 1, save GENMENU on disk. Then make a backup copy of your desktop publisher disk (the latest version if you have the enhancements). Next, load GENMENU from its disk. Insert the backup desktop publisher disk in your disk drive and run GENMENU. This will record the data file FONTMENU on your new desktop publisher disk.

You must now modify DESKTOPL or DESKTOPH on that disk as follows: In DESKTOPL delete lines 350 through 430 and delete the complete DRAW statement from the end of Line 345. Similarly, in DESKTOPH delete lines 395 through 475 and delete the entire HDRAW statement from the end of Line 390. Save the abbreviated DESKTOPL or DESKTOPH on the new desktop publisher disk.

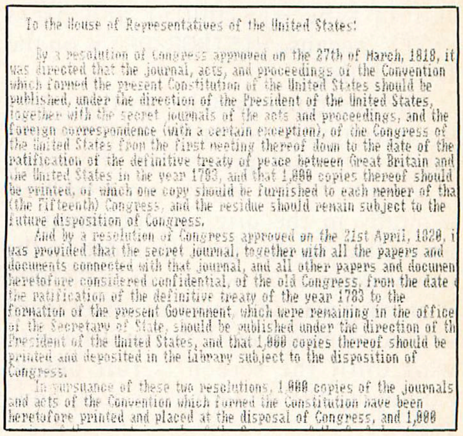
When the programs PATCHWPL and PATCHWPH (listings 2 and 3) are patched into the shortened DESKTOPL and DESKTOPH, respectively, the patched program can enter files derived from the ASCII files of a word processor. Additionally, the patched program will load the font menu from disk when you select F from the main menu. Type NEW and press ENTER to clear the memory of DESKTOPL or DESKTOPH. Carefully type Listing 2 or 3. If your CoCo 1 or 2 cannot safely support the high speed, omit POKE&HFFD7,0 from Line 342 of PATCHWPL and omit all three statements in Line 2020 of PATCHWPL. Next save Listing 2 or 3 on the disk containing GENMENU as follows: For use with DESKTOPL, type SAVE"PATCHWPL",A and press ENTER; for use with DESKTOPH, type SAVE"PATCHWPH",A and press ENTER.

To patch PATCHWPL or PATCHWPH into the abbreviated DESKTOPL or DESKTOPH, respectively, simply insert the new desktop publisher disk in your disk drive and load DESKTOPL or DESKTOPH. Insert the disk containing PATCHWPL or PATCHWPH in your drive. Next, type MERGE"PATCHWPL" and press ENTER for DESKTOPL; or type MERGE"PATCHWPH" and press ENTER for DESKTOPH. Finally, insert the new desktop publisher disk in your drive and save the patched DESKTOPL or DESKTOPH on the disk. Retain its filename, DESKTOPL or DESKTOPH, when you save it, in order to overwrite the unpatched version.

The new DESKTOPL and DESKTOPH will not accept a word processor's ASCII file directly. The file must first be converted to a form compatible with DESKTOPL and DESKTOPH. The programs CONVERTL and CONVERTH (listings 4 and 5, respectively) will convert the ASCII files of any word processor designed to work with the CoCo 1, 2 or 3 to a DESKTOPL- or DESKTOPH- compatible file. CONVERTL and CONVERTH not only perform the conversion but also explain precisely what you must do to produce acceptable ASCII files from your word processor. After typing NEW, carefully type Listing 4 or 5. In typing either of these listings, you will have to type the characters [and]. This is accomplished by use of the SHIFT-down arrow and SHIFT-right arrow, respectively. Save CONVERTL or CONVERTH on the disk containing GENMENU.

The MONROE program (Listing 6) creates a simulated word processor ASCII file. After its conversion by CONVERTL or CONVERTH, this file will be used to illustrate and explain the workings of the ASCII file input feature of the desktop publisher. Therefore, employ NEW to clear program memory and type Listing 6. Save MONROE on the GENMENU disk. Then run MONROE to produce the simulated word processor ASCII file, HISTDOC/TXT.

To convert HISTDOC/TXT to the desktop publisher-compatible form, load CONVERTL for DESKTOPL or CONVERTH for DESKTOPH. Run the program. To learn the word processor requirements, answer the first prompt by pressing Y. After you have digested all the information, answer the next prompt by pressing Y. HISTDOC/TXT is ready to be converted. For the final prompt, type HISTDOC/TXT and press ENTER. HISTDOC/TXT will be converted to HISTDOC/DAT.



To the House of Representatives of the United States:

By a resolution of Congress approved on the 27th of March, 1818, it
was directed that the journal, acts, and proceedings of the Convention
which formed the present Constitution of the United States should be
published, under the direction of the President of the United States,
together with the secret journals of the acts and proceedings, and the
foreign correspondence (with a certain exception), of the Congress of
the United States from the first meeting thereof down to the date of the
ratification of the definitive treaty of peace between Great Britain and
the United States in the year 1783, and that 1,000 copies thereof should
be printed, of which one copy should be furnished to each member of tha
(the Fifteenth) Congress, and the residue should remain subject to the
future disposition of Congress.

And by a resolution of Congress approved on the 21st April, 1820, i
was provided that the secret journal, together with all the papers and
documents connected with that journal, and all other papers and documen
heretofore considered confidential, of the old Congress, from the date
the ratification of the definitive treaty of the year 1783 to the
formation of the present Government, which were remaining in the office
of the Secretary of State, should be published under the direction of th
President of the United States, and that 1,000 copies thereof should be
printed and deposited in the Library subject to the disposition of
Congress.

In pursuance of these two resolutions, 1,000 copies of the journals
and acts of the Convention which formed the Constitution have been
heretofore printed and placed at the disposal of Congress, and 1,000

If you have only one disk drive, you must copy HISTDOC/DAT from the GENMENU disk to the desktop publisher disk. To copy, refer to the GENMENU disk as the source disk and the desktop publisher disk as the destination disk. Insert the source disk in your disk drive. Next, type COPY"HISTDOC/DAT:0" and press ENTER. Your computer will give you the steps needed to copy HISTDOC/DAT onto the destination disk.

Those of you who have two or more disk drives don't need to copy HISTDOC/DAT, because DESKTOPL or DESKTOPH can input compatible files from any drive.

Now you are ready to try the ASCII file input feature. If you have a single disk drive, insert the new desktop publisher disk in your drive. (Two-drive owners should insert the desktop publisher disk in Drive 0 and the GENMENU disk in Drive 1.) Then load and run DESKTOPL or DESKTOPH. For greater screen capacity select F, Font 2 via the main menu. To reach the main menu, press CLEAR for DESKTOPL or F2 for DESKTOPH. While DESKTOPH users have a choice of two screen resolutions on which to input the ASCII files, initially keep it at low resolution. The word processor ASCII file input feature is accessed by employing the main menu input command. When you press I from the main menu, a new screen appears, offering *you two* options:

1. Screen File
2. ASCII File

Formerly, the I command had only one function — loading a previously saved screen from disk. That function is now Option 1. Option 2 loads the word processor ASCII file. Hence, press 2. The desktop publisher will respond by requesting that you supply the filename of the desired ASCII file. Those with single-drive systems should type `HISTDOC` and press ENTER. Two-drive users should type `HISTDOC:1` and press ENTER, because `HISTDOC/DAT` is on the Drive 1 disk.

The computer switches to the working screen, and the cursor moves across the screen and prints out the word "Example." This word, centered horizontally in the original document, is now offset to the right. Included in the new version of `DESKTOPL` or `DESKTOPH` is an easy way to center an offset word or line of characters. You will have to wait until the screen is full before employing the centering process, however.

When the ASCII file input feature is invoked, the desktop publisher automatically turns on wordwrap. Thus, any word not fitting at the end of one line will be erased and printed in its entirety at the beginning of the next line. When full, the screen will be replaced by a prompt asking if you want to save the `HISTDOC` contents that have not been entered. The saved contents will be in a file called `REST:0` if you have a one-disk drive or `REST:1` if you have a two-disk drive. This will leave the file `HISTDOC/DAT` unchanged and intact. In order to continue printing the rest of the contents of `HISTDOC`, answer the prompt by pressing Y for yes. You are then returned to the working screen.

In the main menu, press K to view the list of special keys used by `DESKTOPL` or `DESKTOPH`. The final key listed is SHIFT-up arrow. According to the list, this key combination's function is to move the character line toward the cursor half of the screen. This means that SHIFT-up arrow causes a line of characters to move left or right, depending on whether the cursor is located in the left or right half of that line. Return to the working screen. Since the cursor is already located in the left half of the line containing the word "Example," keep pressing SHIFT-up arrow until "Example" is centered. If you happen to move "Example" too far left, select T from the main menu to set both tabs to 240 for `DESKTOPL` or 300 for `DESKTOPH`. After returning to the working screen, press the down arrow to move the cursor to the right half of the top line. Press SHIFT-up arrow to complete the centering process. In general, the line of characters to be moved must begin or end with a blank space, depending on whether you wish to move the line left or right. Otherwise, you will leave a wake of partial characters as you move the line.

At this point you have several options. With `DESKTOPL`, you may save the screen, make a screen dump or consider what you have done exploratory and take neither of the two options. Because you have two screens with `DESKTOPH`, you can defer saving the screen on disk and making a screen dump until the second screen is full. At this point, let's consider the example exploratory.

To do this, use SHIFT-CLEAR to clear the screen for `DESKTOPL` or use S from the main menu to switch the other

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```
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July 11, 1988   14:37:30

Shell

OS9: xmode /w5 type=0
OS9: iniz /w5
OS9: rsb <>>>/w5 &
&007
```

CLEAR

```
DISK EXTENDED COLOR BASIC 2.1
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UNDER LICENSE FROM MICROSOFT
AND MICROWARE SYSTEMS CORP.

OK
LOAD "DEMO"
OK
LIST
10 CLS 5
20  X=RND(63):Y=RND(31):Z=RND(8)
30  SET(X,Y,Z)
40  GOTO 20
OK
```

CLEAR

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screen for DESKTOPH. Continuing to explore, specify left, right and bottom screen margins before the input of the next portion of HISTDOC.

Specifying a bottom margin of the screen is new. It sets the place at which the ASCII file input feature quits filling the screen. If you want to specify the bottom margin as three lines from the bottom of the screen, press ENTER until the cursor will go down no farther. Then press the up arrow three times for the cursor to reach the desired bottom margin. Select M from the main menu. After you set the top and left margins at 0 and 24, for instance, you will be asked whether you want to change the bottom margin. Because the bottom margin has been the bottom of the screen, press Y for yes. Immediately you will be asked whether you want the bottom margin set to the most recent cursor position. Press Y for yes because the present cursor position is at the desired position. The yes answer is generally made when the screen is intended to represent a whole page or when the bottom half of a page is to be dumped. The no answer is important for fonts whose character sizes are such that a top margin setting of 0 does not allow the cursor to reach the bottom of the screen. To set the right margin, press W from the main menu and enter the value 232 for DESKTOPL or 296 for DESKTOPH.

Follow the W command with the second option of the I command. When a filename is requested, type REST and press ENTER if you have a one-disk drive; otherwise, type REST:1 and press ENTER. The ASCII file input will resume and continue until the specified bottom margin is reached. When the screen is full within the specified margins, the prompt screen will appear. Press Y for yes so that a new REST file is produced, including all of HISTDOC not already brought to the screen.

Continuing the exploration, clear the screen. Press ENTER three times to move the cursor down three lines. The ASCII file input feature brings in text starting at the current cursor position. Therefore, you can establish left, right, upper and lower boundaries to confine the input. Use the second option of the I command to resume the ASCII file input process. The required filename is again REST for single-disk drives or REST:1 for multiple-disk drives.

The ability to confine text input within boundaries is important even to those with screen dumps that provide ample margins on each printed page. If you want to print a border design around the text of your document, you can draw the border, appropriately specify margins and bring in the text. Or you could also specify margins, bring in text and then draw the border. Confining the input text within boundaries is essential when you develop a document composed of two columns of text. For such a document, boundaries are set for the left side of the screen and text is brought to the screen. Then margins are reset for the right side of that same screen, and more text is brought in through the second option of the I command.

When the present screen is full and you have answered the ensuing prompt by pressing Y, draw a border design around the text. To do so, set the top and left margins to 0. Set the bottom margin to the bottom of the screen by answering the two prompts of the main menu command M, pressing Y and N in that order. Using the main menu command W, set the right margin to 256 for DESKTOPL or 320 for DESKTOPH. You must make use of the W command a

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second time to turn off wordwrap. In drawing the border design, select Font 1 because most of the designs (except CoCo Cat) are size-compatible with Font 1. To simplify the drawing of the right border, set both tabs to 240 (DESKTOPL) or to 304 (DESKTOPH).

Use your imagination and experiment in employing the ASCII file input feature to bring in the remainder of the HISTDOC text to further screens. You might change fonts; *Desktop High* users might switch to the higher resolution screen and develop a screen for a two-column document.

Depending on the margin values specified and the font selected, some *Desktop Low* users may encounter a problem with the last line of text entered in the final screen. The problem results from composing the simulated word processor document at 60 characters per line. *Desktop Low* users should write their word processor documents at 30 to 40 characters per line.

Both the original eight font files (offered in "A Desktop Publisher on a Shoestring") as well as an additional nine font files may be obtained by ordering them from me at 172 Dennis Drive, Williamsburg, VA 23185. The disk containing all 17 font files costs $13.50. The supplemental nine font files may be purchased separately for $7. Please include payment by check or money order. ☐

Editor's Note: The files PATCHWPL *and* PATCHWPH *are stored in binary format on this month's RAINBOW ON TAPE and DISK. To resave the files in the required ASCII format and/or transfer them from tape to disk, first load the file using (C)*LOAD "filename". Once the file is in memory, save it to disk by entering* SAVE *"filename"*, A. *RAINBOW ON DISK users please note: You will have to use a disk other than the original since it is write-protected. This should not be an inconvenience, as you should be using a backup of the original anyway.*

Listing 1: GENMENU

```
0 '***    GENMENU    ***
1 '  BY H. ALLEN CURTIS
2 '    COPYRIGHT 1988
10 D$(1)="BM50,24G3ERE2R4GNL3G4D
5EU4BR2D5G4UH2LG2ER3FERE2URUE2NF
G2U4E4F2DH2DFBM64,29G2ND4LD4NHFR
E2NU5RU4FBM72,29G2RD4NHFNEU4NU2E
3ND6FNFD6E2BM83,25G3LR3NR2NUD8NE
2H2RU5
20 D$(2)="BM49,43R6NDNGL5D3NR3D3
NLR2HU4BM59,45ND3GD2FR3NU3EU2HL2
BM66,45D4RU4R3D4RU3BM76,43ND5G2N
R4FD2FRE
30 D$(3)="BM50,56R5BR2DNLNRDRNRD
RE2BL7L5DLNGBR5G2ND8GD8BDBL2L2DR
2DFNDRURE2U9NE3RD3ND4REFBM64,61G
2ND6LD5LF2RE2NU7RU6FBM72,61NG2D3
E3DRFLD7NE2HNU6BL2GNU5LNHU7BM83,
57G2RD11NE2H2RU8L2R5
40 D$(4)="BM46,78R11D2RHL2BL6D6R
3D2ENRHL3D6GU13LBM62,82G3D2F3R5E
3U2H3L4G3D2F3R3E3U2H2BM72,82R3GN
LD7RU5NU2E3R2DRD7LNUE2U4BM88,80D
LGR7NR5G5UNE2FDRDRDR4E2
50 D$(5)="BM48,96NR6D8RU4NU3R3BM
56,99ND4GD3FR4NU5EU3HL3BM64,99D5
RU5R4D5U4BM74,96D7FRHU5NL3NR2U2
60 D$(6)="BM48,109R7NDL6D8NLR2HU
3NU3R3NUDBM58,112ND4GD3FR4NU4EU3
HL3BM66,112RD5NLR2HU3ER3D5NLR2HU
3BM79,109D8REBL3U4NR3NL2U2
70 D$(7)="BM52,123R4NFL4G2D2NR3D
4BM60,125G2D2F2R2E2U2H2LBM68,125
ND6FER2F2D4BM78,123DND7GR4
80 D$(8)="BM50,136NGR3NR4D4L2NGR
3NU3NR2D2HD2GL3BM62,138G2DED2R3E
2UGU2L2BM70,138NGD4RUNU3E3RD4RNE
U3BM81,136D6R2NEL2HU4GR4
90 D$(9)="BM50,148NG3NR7ND3FD3NR
4L3NGR3ND7LD8GL3BM60,148G3NRF2NU
3R3E2NU2LU3L2BM68,148G2RD3RU2NU2
E3RD5RNE2U4BM79,147NG2D2NR2ND3LD
3FR2E2
100 D$(10)="BM50,164NR3D2NR2D3BM
56,166GDFREUHBM61,166D2NDE2FD2BM
68,164D2NLNRD2FE
200 N$(1)="BR2NGD6NL2R2BU6BR6
210 N$(2)="NGNDR3ND2FDGL2NG2DG2R
5ULBR6BU5
220 N$(3)="NGNDR3ND5FDGNL2FDGL3U
LBU5BR11
230 N$(4)="BR2BD6G3DE4D6NLRNRU2N
RNL4U4BR6
240 N$(5)="BD6NR5D2EDR3ND3FD2GL3
ULBU5R5BR6
250 N$(6)="BR2BD4NR2G2D3FR3NU2EU
HL3ND2UEBU3BD2BR8
260 N$(7)="BD2NDNFR5D2HDG2D2RU2E
BU3BR6
270 N$(8)="BRBU2ND5GDFGDFR3NU5EU
```

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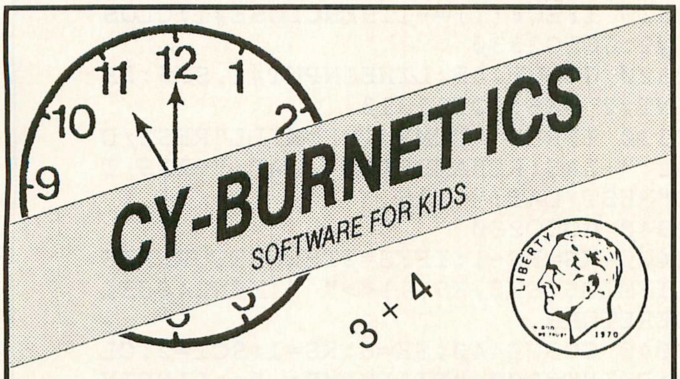
```
HNL2EUHL2BUBR6BDBR4
280 N$(9)="BR2BU5ND2GDFR3DG2NLRE
2U3HND2L2BR6
290 N$(10)="BR2BU8ND5GD4FR3U5G2D
E3ND4HL2
300 OPEN"O",#1,"FONTMENU"
310 FORI=1TO10:PRINT#1,N$(I)+D$(
I):NEXT:CLOSE#1
```

```
197 ......112  2305 .....194
492 ......249  END  .....204
2030 .....212
```

Listing 2: PATCHWPL

```
6 SS=1:SF=1:FC=1:CD=7
50 IFQ=1 AND Z<>U AND L+4>W-1THE
NFL=1:GOTO175
62 IFSCI=1THEN960ELSEIFSCI=2 AND
 KS=1THEN2020ELSEIFSCI=2THEN2030
95 IFK=32THENZ=L+S:IFL+8<W THENL
INE(L,T)-(L+7,T+D),PRESET,BF:L=L
+S:GOTO45ELSELINE(L,T)-(L+1,T+D)
,PRESET,BF:L=U:IFT<P AND T<191-D
*2THENT=T+1+D:GOTO45ELSEFL=0:GOT
O2080
110 IFK=8THENLINE(L,T)-(L+1,T+D)
,PRESET,BF:IFL>1THENL=L-2:GOTO45
ELSEL=0:GOTO45
151 IFK=95THENI=4:PUT(L,T)-(L+1,
T+D),S:IFL>W*.5THENGET(U,T)-(W-I
-1,T+D),G,G:PUT(U+I,T)-(W-1,T+D)
,G,PSETELSEGET(U+I,T)-(W-1,T+D),
G,G:PUT(U,T)-(W-1-I,T+D),G,PSET
155 IFK<>95THENPUT(L,T)-(L+1,T+D
),S:GOTO45ELSE45
165 IFQ=0 OR Z=U THENL=U:IFT<P A
ND T<191-D*2THENT=T+D+1:GOTO70EL
SE70
170 FL=2
175 Z1=2*INT(.5*Z):Z=Z1
180 GET(Z,T)-(L,T+D),G,G:GOSUB19
7:L1=L-Z:L=U:Z=U:IFT<P AND T<191
-D*2THENT=T+D+1ELSE2080
190 IFSCI<>2THENPUT(L,T)-(L+L1,T
+D),G,PSET:L=L+L1+L2:L=2*INT(.5*
L+.5):L2=0ELSEL=U:GOSUB2400:KS=K
S+1:GOTO2030
193 N=FL+1:ON N GOTO45,55,70
197 IFCC=0THENPUT(Z,T)-(L,T+D),R
,PSET:RETURNELSEPUT(Z,T)-(L,T+D)
,R,PRESET:RETURN
198 IFCC=0THENPUT(U,T)-(W-1,T+D)
,R,PSET:RETURNELSEPUT(U,T)-(W-1,
```



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```
T+D),R,PRESET:RETURN
199 IFCC=0THENPUT(18,20)-(113,17
0),R,PSET:RETURNELSEPUT(18,20)-(
113,170),R,PRESET:RETURN
230 IFK$="I" OR K$="i"THEN3060
340 SCREEN1,C
341 DRAW"S"+STR$(4*SF)
342 GET(L,T)-(L+1,T+D),S:POKE&HF
FD7,0:GOTO45
345 SCREEN1,C:GET(18,20)-(113,17
0),F,G:GOSUB199
355 Y=10:OPEN"I",#1,"FONTMENU"
365 FORI=0TO9:GOSUB440:LINEINPUT
#1,A$:Y=Y+16:DRAW"S4BM24,"+STR$(
Y)+A$:NEXT:CLOSE#1
490 CLS:PRINT@195,"DO YOU WANT T
O CHANGE THE":PRINT"   BOTTOM MA
RGIN? (Y/N) ";
491 K$=INKEY$:IFK$=""THEN491ELSE
IFK$="N" OR K$="n"THENL=U:T=V:RE
TURNELSEIFK$="Y" OR K$="y"THEN49
2ELSESOUND60,5:GOTO491
492 PRINT@323,"DO YOU WANT IT AT
 THE MOST":PRINT"    RECENT CURSO
R POSITION?":PRINT"      (Y/N)":PR
INT"   IF NOT, IT WILL BE SET TO
":PRINT"   THE LOWEST POSSIBLE C
URSOR":PRINT"    POSITION":IFV$="
B" OR V$="b"THENGOSUB980
493 K$=INKEY$:IFK$=""THEN493ELSE
IFK$="N" OR K$="n"THENGOSUB980:G
OTO495ELSEIFK$="Y" OR K$="y"THEN
P=T:L=U:T=V:RETURNELSESOUND60,5:
GOTO493
495 P=V+(D+1)*(-1+INT((192-V)/(D
+1))):RETURN
551 PRINT" SHIFT ";CHR$(94);": M
OVE CHAR-LINE TOWARD":PRINT"
     CURSOR HALF OF SCREEN":PRI
NT
960 POKE&H23,A1:POKE&H24,A2:IFKS
<=LEN(AC$)THENK$=MID$(AC$,KS,1):
KS=KS+1:GOSUB970:GOTO70ELSESCI=0
:PUT(L,T)-(L+1,T+D),S:U=UT:GOTO4
5
970 IFASC(K$)=94THENK$=CHR$(13):
RETURNELSERETURN
980 V=192-(D+1)*INT(192/(D+1)):T
=V:RETURN
2020 POKE&HFFD6,0:IFEOF(1)=-1THE
NCLOSE#1:POKE&HFFD7,0:SCI=0:PUT(
L,T)-(L+1,T+D),S:U=UT:GOTO45ELSE
GOSUB445:LINEINPUT#1,SK$:POKE&HF
FD7,0
2025 IFSK=0THENSCI=0:U=UT:GOTO22
00
2030 POKE&H23,A1:POKE&H24,A2:IFK
S<=LEN(SK$)THENK$=MID$(SK$,KS,1)
ELSE2100
2032 IFASC(K$)=91THENK$=CHR$(13)
:RS=1
2035 IFL>U AND KS=1 AND K$=" "TH
ENPUT(L,T)-(L+1,T+D),S:L=U:IFT<P
 AND T<191-2*D THENT=T+1+D ELSES
K=0:GOTO2025
2040 KS=KS+1:GOTO70
2080 IFSCI<>2THEN193ELSESK=0:GOT
O2025
2100 IFSK$=""THENPUT(L,T)-(L+1,T
+D),S:L=U ELSEKS=1:IFRS=1THENRS=
0:GOTO2020ELSEIFL+S+8>W THEN3100
ELSEK$=" ":GOTO70
2110 IFT<P AND T<191-2*D THENT=T
+1+D:GOTO70ELSESK=0:GOTO2025
2200 T=V:CLS:PRINT@195,"SAVE RES
T OF ";FA$;":";ZA$:PRINT"    FOR
LATER INPUT?   (Y/N)  ";
2220 K$=INKEY$:IFK$=""THEN2220
2230 IFK$="N" OR K$="n"THENCLOSE
#1:GOTO280
2240 IFK$="Y" OR K$="y"THENPRINT
@386,"THE REST WILL BE SAVED IN
THE    FILE CALLED REST:";ZA$
2300 IFFA$="REST"THENRE$="TEMP"E
LSERE$="REST
2301 POKE&HFFD6,0:OPEN"O",#2,RE$
+":"+ZA$
2305 GOSUB2400:IFKS>=LEN(SK$)THE
N2310
2307 PRINT#2,RIGHT$(SK$,LEN(SK$)
-KS)
2310 IFEOF(1)=-1THENCLOSE#1:CLOS
E#2:GOTO2330
2320 GOSUB445:LINEINPUT#1,SK$:PR
INT#2,SK$:GOTO2310
2330 IFRE$="TEMP"THENKILL"REST/D
AT:"+ZA$:RENAME"TEMP/DAT:"+ZA$ T
O"REST/DAT:"+ZA$
2340 GOTO280
2400 KS=KS-1:IFKS=0THENRETURNELS
EIFMID$(SK$,KS,1)<>" "THEN2400EL
SERETURN
3040 GOSUB440:SK=6:KS=1:SCI=2:CL
S:PRINT@200,"FILENAME: ";:LINEIN
PUTFA$:Z$=RIGHT$(FA$,2):ZA$="0":
IFASC(Z$)=58THENZA$=RIGHT$(Z$,1)
:FA$=LEFT$(FA$,LEN(FA$)-2)
3050 POKE&HFFD6,0:OPEN"I",#1,FA$
+":"+ZA$:RETURN
3060 GOSUB440:CLS:PRINT@200,"1:
SCREEN FILE":PRINT@232,"2: ASCII
 FILE"
3070 K$=INKEY$:IFK$=""THEN3070EL
SEIFK$="1"THENGOSUB20:GOTO200ELS
EIFK$="2"THEN3080ELSESOUND60,5:G
OTO200
3080 Q=1:UT=U:GOSUB3040:GOTO280
3100 PUT(L,T)-(L+1,T+D),S:L=U:IF
T<P AND T<191-2*D THENT=T+D+1:GO
TO2020ELSESK$="":GOTO2110
3600 CLOSE#1:FORI=0TO3000:NEXT:G
OTO200
```

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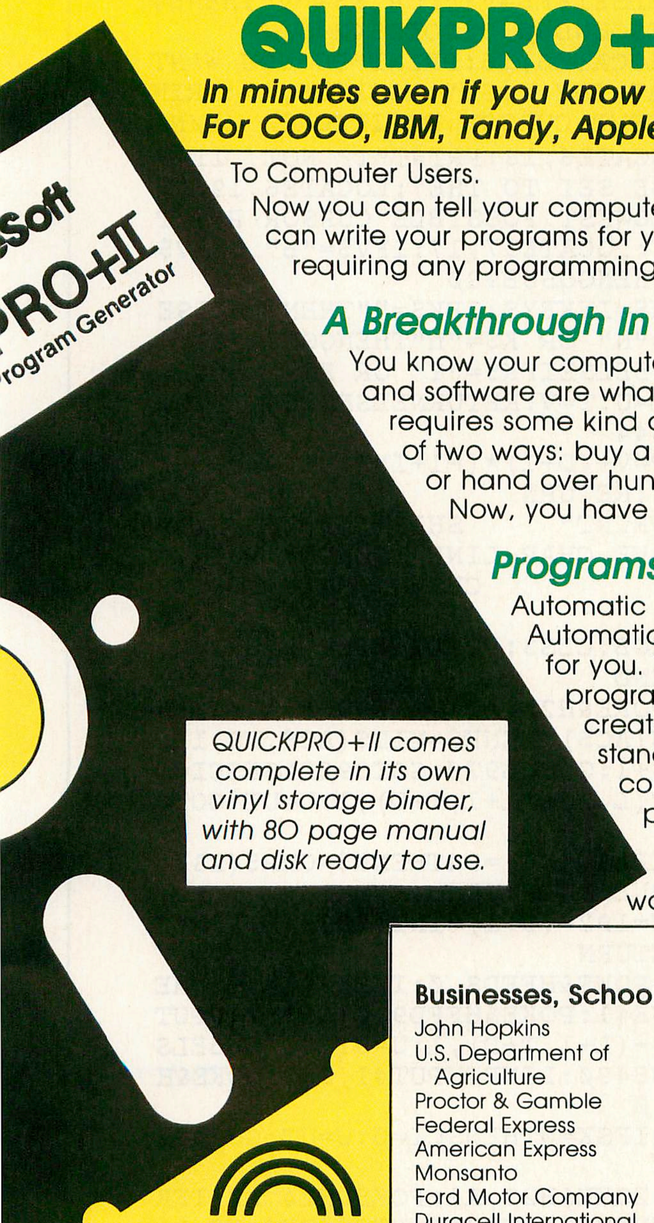

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```
210 .......77
543 ......133
2025 ......31
2210 .....190
3060 .....111
END ......20
```

Listing 3: PATCHWPH

```
11 SS=1:SF=1:FC=1:CD=7
16 HCOLOR3:ON BRK GOTO715
18 ON ERR GOTO7000
50 HSCREENH:HBUFF1,399:HGET(8,15
2)-(9,152+D),1
70 IFQ=1 AND Z<>U AND L+4>W-1THE
NFL=1:GOTO195
82 IFSCI=1THEN960ELSEIFSCI=2 AND
 KS=1THEN2020ELSEIFSCI=2THEN2030
115 IFK=32THENZ=L+S:IFL+8<W THEN
HLINE(L,T)-(L+7,T+D),PRESET,BF:L
=L+S:GOTO65ELSEHLINE(L,T)-(L+1,T
+D),PRESET,BF:L=U:IFT<P AND T<19
1-2*D THENT=T+1+D:GOTO65ELSEFL=0
:GOTO2080
130 IFK=8THENL=2*INT(.5*L):HLINE
(L,T)-(L+1,T+D),PRESET,BF:IFL>1T
HENL=L-2:GOTO65ELSEL=0:GOTO65
171 IFK=95THENI=2*H+2:HPUT(L,T)-
(L+1,T+D),1:IFL>W*.5THENHGET(U,T
)-(W-I-1,T+D),6:HPUT(U+I,T)-(W-1
,T+D),6ELSEHGET(U+I,T)-(W-1,T+D)
,6:HPUT(U,T)-(W-1-I,T+D),6
175 IFK<>95THENHPUT(L,T)-(L+1,T+
D),1:GOTO65ELSE65
185 IFQ=0 OR Z=U THENL=U:IFT<P A
ND T<191-2*D THENT=T+D+1:GOTO90E
LSE90
190 FL=2
210 HGET(Z,T)-(L,T+D),6:HPUT(Z,T
)-(L,T+D),4:L1=L-Z:L=U:Z=U:IFT<P
 AND T<191-2*D THENT=T+D+1ELSE20
80
220 IFSCI<>2THENHPUT(L,T)-(L+L1,
T+D),6:L=L+L1+L2:L=2*INT(.5*L+.5
):L2=0ELSEL=U:GOSUB2400:KS=KS+1:
GOTO2030
223 N=FL+1:ON N GOTO65,75,90
265 IFK$="I" OR K$="i"THEN3060
385 GOSUB545
387 HGET(L,T)-(L+1,T+D),1:GOTO65
390 POKE&HE6E4,&HE6:HSCREENH:POK
E&HE6E4,&HE7:HGET(16,20)-(111,17
0),5:HPUT(16,20)-(111,95),4:HPUT
(16,96)-(111,170),4
400 Y=10:OPEN"I",#1,"FONTMENU"
410 FORI=0TO9:GOSUB485:LINEINPUT
#1,A$:Y=Y+16:HDRAW"S4BM24,"+STR$
(Y)+A$:NEXT:CLOSE#1
541 CLS:LOCATE6,12:PRINT"DO YOU
WANT TO CHANGE THE":LOCATE6,13:P
RINT"BOTTOM MARGIN?  (Y/N) ";
542 K$=INKEY$:IFK$=""THEN542ELSE
IFK$="N" OR K$="n"THENL=U:T=V:RE
TURNELSEIFK$="Y" OR K$="y"THEN54
3ELSESOUND60,5:GOTO542
543 LOCATE6,16:PRINT"DO YOU WANT
 IT AT THE MOST":LOCATE6,17:PRIN
T"RECENT CURSOR POSITION?  (Y/N)
 ":LOCATE6,18:PRINT"IF NOT, IT W
ILL BE SET TO THE":LOCATE6,19:PR
INT"LOWEST POSSIBLE CURSOR POSIT
ION.":LOCATE37,17:IFV$="B" OR V$
="b"THENGOSUB980
544 K$=INKEY$:IFK$=""THEN544ELSE
IFK$="N" OR K$="n"THENGOSUB980:G
OTO545ELSEIFK$="Y" OR K$="y"THEN
P=T:L=U:T=V:RETURNELSESOUND65,0:
GOTO544
545 P=V+(D+1)*(-1+INT((192-V)/(D
+1))):RETURN
617 PRINT"      SHIFT ";CHR$(94)+
": MOVE CHAR-LINE TOWARD":PRINT"
                 CURSOR HALF OF SCR
EEN"
715 RGB:CLS3:POKE&HFFD8,0:DRIVE0
720 END
960 POKE&H23,A1:POKE&H24,A2:IFKS
<=LEN(AC$)THENK$=MID$(AC$,KS,1):
KS=KS+1:GOSUB970:GOTO90ELSESCI=0
:HPUT(L,T)-(L+1,T+D),1:U=UT:GOTO
65
970 IFASC(K$)=94THENK$=CHR$(13):
RETURNELSERETURN
980 V=192-(D+1)*INT(192/(D+1)):T
=V:RETURN
2020 POKE&HFFD8,0:IFEOF(1)=-1THE
NCLOSE#1:POKE&HFFD9,0:SCI=0:HPUT
(L,T)-(L+1,T+D),1:U=UT:GOTO65ELS
EGOSUB490:LINEINPUT#1,SK$:POKE&H
FFD9,0
2025 IFSK=0THENSCI=0:U=UT:GOTO22
00
2030 POKE&H23,A1:POKE&H24,A2:IFK
S<=LEN(SK$)THENK$=MID$(SK$,KS,1)
ELSE2100
2032 IFASC(K$)=91THENK$=CHR$(13)
:RS=1
2035 IFL>U AND KS=1 AND K$=" "TH
ENHPUT(L,T)-(L+1,T+D),1:L=U:IFT<
P AND T<191-2*D THENT=T+1+D ELSE
SK=0:GOTO2025
2040 KS=KS+1:GOTO90
2050 IFH=1THENU=4*INT(.25*L):RET
URNELSEU=8*INT(.125*L):RETURN
2080 IFSCI<>2THEN223ELSESK=0:GOT
O2025
2100 IFSK$=""THENHPUT(L,T)-(L+1,
T+D),1:L=U ELSEKS=1:IFRS=1THENRS
=0:GOTO2020ELSEIFL+S+8>W THEN310
0ELSEK$=" ":GOTO90
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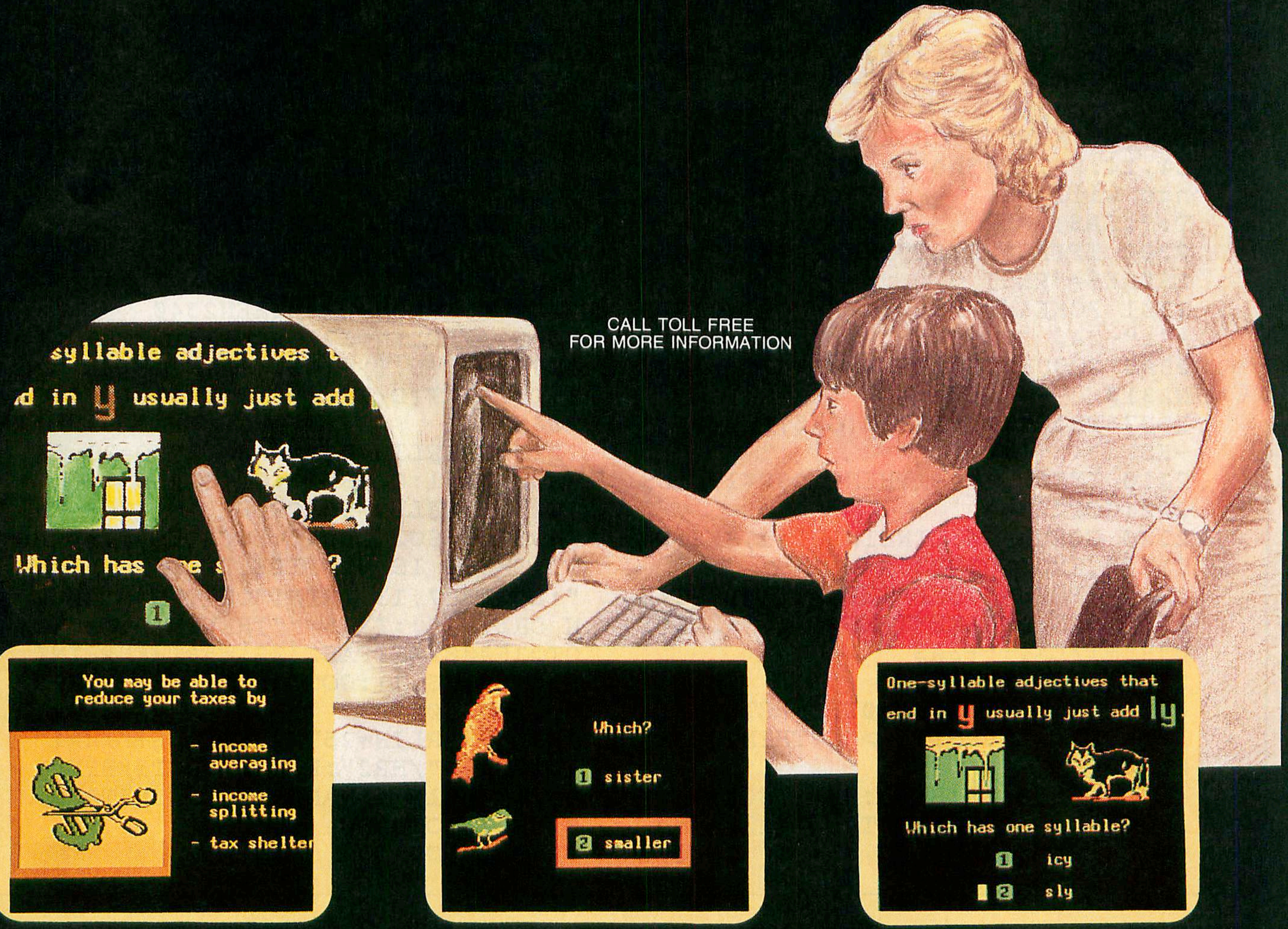

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```
2110 IFT<P AND T<191-2*D THENT=T
+1+D:GOTO90ELSESK=0:GOTO2025
2200 T=V:HSCREEN0:CLS:ATTR0,4
2210 LOCATE4,8:PRINT"Do you want
 to save on disk the          res
t of the ASCII strings of":LOCAT
E13,10:PRINTFA$;":";ZA$:LOCATE4,
11:PRINT"for later translation t
o their           font images? (Y
/N)  ";
2220 K$=INKEY$:IFK$=""THEN2220
2230 IFK$="N" OR K$="n"THENCLOSE
#1:GOTO320
2240 IFK$="Y" OR K$="y"THENLOCAT
E4,14:PRINT"The rest of the stri
ngs will be           saved in RES
T:";ZA$;
2300 IFFA$="REST"THENRE$="TEMP"E
LSERE$="REST
2301 POKE&HFFD8,0:OPEN"O",#2,RE$
+":"+ZA$
2305 GOSUB2400:IFKS>=LEN(SK$)THE
N2310
2307 PRINT#2,RIGHT$(SK$,LEN(SK$)
-KS)
2310 IFEOF(1)=-1THENCLOSE#1:CLOS
E#2:GOTO2330
2320 GOSUB490:LINEINPUT#1,SK$:PR
INT#2,SK$:GOTO2310
2330 IFRE$="TEMP"THENKILL"REST/D
AT:"+ZA$:RENAME"TEMP/DAT:"+ZA$ T
O"REST/DAT:"+ZA$
2340 GOTO320
2400 KS=KS-1:IFKS=0THENRETURNELS
EIFMID$(SK$,KS,1)<>" "THEN2400EL
SERETURN
3040 GOSUB485:SK=6:KS=1:SCI=2:CL
S:LOCATE4,8:PRINT"Type filename
of ASCII file you          want t
ranslated:  ";:LINEINPUTFA$:Z$=R
IGHT$(FA$,2):ZA$="0":IFASC(Z$)=5
8THENZA$=RIGHT$(Z$,1):FA$=LEFT$(
FA$,LEN(FA$)-2)
3050 POKE&HFFD8,0:OPEN"I",#1,FA$
+":"+ZA$:RETURN
3060 GOSUB485:CLS:LOCATE11,10:PR
INT"1: SCREEN FILE":LOCATE11,11:
PRINT"2: ASCII FILE"
3070 K$=INKEY$:IFK$=""THEN3070EL
SEIFK$="1"THENGOSUB30:GOTO230ELS
EIFK$="2"THEN3080ELSESOUND60,5:G
OTO230
3080 Q=1:UT=U:GOSUB3040:GOTO320
3100 HPUT(L,T)-(L+1,T+D),1:L=U:I
FT<P AND T<191-2*D THENT=T+D+1:G
OTO2020ELSESK$="":GOTO2110
3600 CLOSE#1:FORI=0TO3000:NEXT:G
OTO230
7000 IFERLIN=2330THEN2340
7005 IFERLIN=170THENT1=T:FORI=1T
OSF:HPUT(U,T)-(W-1,T+INT(D/SF)),
4:T=T+INT(D/SF):NEXT:T=T1:L=U:GO
TO65
7010 IFERLIN=2320 AND ERNO=23 TH
ENCLOSE#1:CLOSE#2:GOTO2330
7020 IFERLIN=30 OR ERLIN=3050 TH
ENSCI=0:SOUND60,5:LOCATE5,12:PRI
NT"THERE IS NO FILE BY THAT NAME
":LOCATE7,13:PRINT"ON THE DISK I
N DRIVE ";:IFZ$=""THENPRINT"0":G
OTO3600ELSEIFASC(Z$)=58THENPRINT
RIGHT$(Z$,1):GOTO3600ELSEPRINT"0
":GOTO3600
7030 IFERLIN=25THENKILLF$+"/HR1"
:KILLF$+"/HR2":RENAME"OUT1/BIN"T
OF$+"/HR1":RENAME"OUT2/BIN"TOF$+
"/HR2":GOTO230
7040 GOTO715
```

150 172
300 233
460 133
END 251

Listing 4: CONVERTL

```
10 CLEAR3000
20 CLS:PRINT@140,"CONVERTL":PRIN
T@199,"BY H. ALLEN CURTIS":PRINT
@233,"COPYRIGHT 1988
30 PRINT:PRINT" DO YOU NEED INST
RUCTIONS ABOUT":PRINT" WHAT THIS
 PROGRAM DOES & WHAT":PRINT" ITS
 REQUIREMENTS ARE?  (Y/N)":PRINT
"     ";
40 K$=INKEY$:IFK$=""THEN40ELSEPR
INTK$;:IFK$="N"THEN380ELSEIFK$<>
"Y"THEN40
50 DIMA$(25)
60 A$(0)="    THIS PROGRAM CONVER
TS A
70 A$(1)="WORD PROCESSOR FILE TO
 ANOTHER
80 A$(2)="DISK FILE WITH A STRUC
TURE
90 A$(3)="COMPATIBLE WITH DESKTO
PL
100 A$(4)="USAGE.
110 A$(5)="    THE WORD PROCESSOR
 FILE
120 A$(6)="MUST BE A "+CHR$(34)+
"PURE"+CHR$(34)+" ASCII FILE:
130 A$(7)="NO IMBEDDED CODES, NO
 PRINTER
140 A$(8)="CODES, NO HYPHEN ENDI
NG LINES,
150 A$(9)="AND NO CHARACTERS NOT
 IN THE
160 A$(10)="CHARACTER SET OF DES
KTOPL.
170 A$(11)="   THE WORD PROCESSO
R FILE
180 A$(12)="MUST ALSO BE MODIFIE
D AS
190 A$(13)="FOLLOWS:
200 A$(14)="1. YOU MUST APPEND T
HE
210 A$(15)="CHARACTER [ TO THE E
ND OF ANY
220 A$(16)="LINE THAT ENDS WITH
MORE
230 A$(17)="SPACES THAN THE NUMB
ER OF
240 A$(18)="CHARACTERS IN THE FI
RST WORD
250 A$(19)="OF THE NEXT LINE IF
THAT NEXT
260 A$(20)="LINE DOES NOT START
WITH ONE
270 A$(21)="OR MORE SPACES.
280 A$(22)="2. YOU MUST APPEND T
HE
290 A$(23)="CHARACTER ] TO THE E
ND OF THE
300 A$(24)="LAST LINE OF THE DOC
UMENT.
320 CLS:FORI=0TO13
330 PRINT" ";A$(I):NEXT:PRINT:PR
INT"    PRESS SPACE TO CONTINUE"
;
340 K$=INKEY$:IFK$=""THEN340
350 CLS:PRINT:FORI=14TO24:PRINT"
 ";A$(I):NEXT
360 PRINT:PRINT" DO YOU HAVE A S
UITABLE FILE":PRINT" READY? (Y/N
) ";
370 K$=INKEY$:IFK$=""THEN370ELSE
IFK$="Y"THEN380ELSEEND
380 CLS:PRINT@193,"ENTER FILENAM
E OF ASCII FILE.":PRINT" INCLUDE
 THE EXTENSION.":PRINT"         "
;:LINEINPUTF$
390 N=INSTR(F$,"/"):IFN=0THEN380
ELSEG$=LEFT$(F$,N)+"DAT"
400 IFRIGHT$(F$,3)="DAT"THENRENA
MEF$ TO LEFT$(F$,N)+"TXT"
410 CLS:PRINT@235,"CONVERTING ";
420 OPEN"D",#1,F$:FIELD#1,128 AS
 A$,128 AS B$
430 OPEN"O",#2,G$
440 IFDONE=1THENCLOSE#1:PRINT"."
;:PRINT#2,Q$:CLOSE#2:PRINT:PRINT
```

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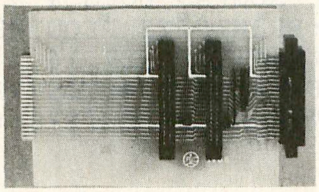

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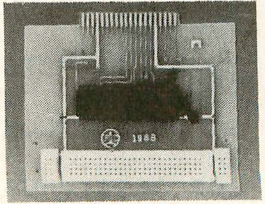

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```
"             DONE":ENDSTOPE
LSENO=NO+1:GET#1,NO:Q$=A$
450 M$="]":A=INSTR(A$,M$):B=INST
R(B$,M$):IFA>0 OR B>0THENDONE=1:
IFB>0THENB$=LEFT$(B$,B-1)ELSEQ$=
LEFT$(Q$,A-1):B$=""
460 N=INSTR(Q$,CHR$(13))
470 IFN>0THENGOSUB620:PRINT".";:
Q$=RIGHT$(Q$,LEN(Q$)-N):IFQ$=""T
HENQ$=B$:GOTO530ELSE460
480 I=1
490 IFLEN(Q$)=I THENK=0:GOTO520
500 K=INSTR(LEN(Q$)+1-I,Q$," "):
IFK=0THENI=I+1:GOTO490
510 PRINT#2,LEFT$(Q$,K-1):PRINT"
.";
520 Q$=RIGHT$(Q$,LEN(Q$)-K)+B$
530 N=INSTR(Q$,CHR$(13))
540 IFN>0THENGOSUB620:PRINT".";:
Q$=RIGHT$(Q$,LEN(Q$)-N):IFQ$=""T
HEN440ELSE530
550 I=1
560 IFLEN(Q$)=I THENK=0:GOTO590
570 K=INSTR(LEN(Q$)+1-I,Q$," "):
IFK=0THENI=I+1:GOTO560
580 PRINT#2,LEFT$(Q$,K-1):PRINT"
.";
590 Q$=RIGHT$(Q$,LEN(Q$)-K)
600 IFDONE=1THENCLOSE#1:PRINT"."
;:PRINT#2,Q$:CLOSE#2:PRINT:PRINT
"              DONE":ENDELSENO=N
O+1:GET#1,NO:Q$=Q$+A$
610 GOTO450
620 IFLEFT$(Q$,N)=CHR$(13)THENPR
INT#2," [":RETURNELSEPRINT#2,LEF
T$(Q$,N-1):RETURN
```

150 142
300 199
450 51
END 197

Listing 5: CONVERTH

```
10 CLEAR3000
20 WIDTH40:ATTRO,4:CLS:LOCATE16,
6:PRINT"CONVERTH":LOCATE11,8:PRI
NT"BY H. ALLEN CURTIS":LOCATE13,
9:PRINT"COPYRIGHT 1988
30 LOCATE5,12:PRINT"DO YOU NEED
INSTRUCTIONS ABOUT":LOCATE5,13:P
RINT"WHAT THIS PROGRAM DOES & WH
AT":LOCATE5,14:PRINT"ITS REQUIRE
MENTS ARE?  (Y/N)":LOCATE7,16
40 K$=INKEY$:IFK$=""THEN40ELSEPR
INTK$;:IFK$="N"THEN380ELSEIFK$<>
"Y"THEN40
50 DIMA$(25)
60 A$(0)="   THIS PROGRAM CONVER
TS A
70 A$(1)="WORD PROCESSOR FILE TO
 ANOTHER
80 A$(2)="DISK FILE WITH A STRUC
TURE
90 A$(3)="COMPATIBLE WITH DESKTO
PH
100 A$(4)="USAGE.
110 A$(5)="   THE WORD PROCESSOR
 FILE
120 A$(6)="MUST BE A "+CHR$(34)+
"PURE"+CHR$(34)+" ASCII FILE:
130 A$(7)="NO IMBEDDED CODES, NO
 PRINTER
140 A$(8)="CODES, NO HYPHEN ENDI
NG LINES,
150 A$(9)="AND NO CHARACTERS NOT
 IN THE
160 A$(10)="CHARACTER SET OF DES
KTOPH.
170 A$(11)="   THE WORD PROCESSO
R FILE
180 A$(12)="MUST ALSO BE MODIFIE
D AS
190 A$(13)="FOLLOWS:
200 A$(14)="1. YOU MUST APPEND T
HE
210 A$(15)="CHARACTER [ TO THE E
ND OF ANY
220 A$(16)="LINE THAT ENDS WITH
MORE
230 A$(17)="SPACES THAN THE NUMB
ER OF
240 A$(18)="CHARACTERS IN THE FI
RST WORD
250 A$(19)="OF THE NEXT LINE IF
THAT NEXT
260 A$(20)="LINE DOES NOT START
WITH ONE
270 A$(21)="OR MORE SPACES.
280 A$(22)="2. YOU MUST APPEND T
HE
290 A$(23)="CHARACTER ] TO THE E
ND OF THE
300 A$(24)="LAST LINE OF THE DOC
UMENT.
310 WIDTH40:ATTR0,4
320 CLS:PRINT:PRINT:PRINT:PRINT:
FOR I=0TO13
330 PRINT"     ";A$(I):NEXT:PRINT
:PRINT:PRINT:PRINT"           ";:AT
TR7,4,B:PRINT"HIT SPACE TO CONTI
NUE";:ATTR0,4
340 K$=INKEY$:IFK$=""THEN340
350 CLS:PRINT:PRINT:PRINT:PRINT:
FORI=14TO24:PRINT"     ";A$(I):NE
XT
360 ATTR7,4:LOCATE5,18:PRINT"DO
```

```
YOU HAVE A SUITABLE FILE":LOCATE
5,19:PRINT"READY? (Y/N)  ";:ATTR
0,4
370 K$=INKEY$:IFK$=""THEN370ELSE
IFK$="Y"THEN380ELSEEND
380 CLS:LOCATE5,9:PRINT"ENTER FI
LENAME OF ASCII FILE.":LOCATE5,1
0:PRINT"INCLUDE THE EXTENSION.":
LOCATE12,12:LINEINPUTF$
390 N=INSTR(F$,"/"):IFN=0THEN380
ELSEG$=LEFT$(F$,N)+"DAT"
400 IFRIGHT$(F$,3)="DAT"THENRENA
MEF$ TO LEFT$(F$,N)+"TXT"
410 CLS:LOCATE15,10:PRINT"CONVER
TING ";
420 OPEN"D",#1,F$:FIELD#1,128 AS
 A$,128 AS B$
430 OPEN"O",#2,G$
440 IFDONE=1THENCLOSE#1:PRINT"."
;:PRINT#2,Q$:CLOSE#2:PRINT:PRINT
"                      DONE":ENDS
TOPELSENO=NO+1:GET#1,NO:Q$=A$
450 M$="]":A=INSTR(A$,M$):B=INST
R(B$,M$):IFA>0 OR B>0THENDONE=1:
IFB>0THENB$=LEFT$(B$,B-1)ELSEQ$=
LEFT$(Q$,A-1):B$=""
460 N=INSTR(Q$,CHR$(13))
470 IFN>0THENGOSUB620:PRINT".";:
Q$=RIGHT$(Q$,LEN(Q$)-N):IFQ$=""T
HENQ$=B$:GOTO530ELSE460
480 I=1
490 IFLEN(Q$)=I THENK=0:GOTO520
500 K=INSTR(LEN(Q$)+1-I,Q$," "):
IFK=0THENI=I+1:GOTO490
510 PRINT#2,LEFT$(Q$,K-1):PRINT"
.";
520 Q$=RIGHT$(Q$,LEN(Q$)-K)+B$
530 N=INSTR(Q$,CHR$(13))
540 IFN>0THENGOSUB620:PRINT".";:
Q$=RIGHT$(Q$,LEN(Q$)-N):IFQ$=""T
HEN440ELSE530
550 I=1
560 IFLEN(Q$)=I THENK=0:GOTO590
570 K=INSTR(LEN(Q$)+1-I,Q$," "):
IFK=0THENI=I+1:GOTO560
580 PRINT#2,LEFT$(Q$,K-1):PRINT"
.";
590 Q$=RIGHT$(Q$,LEN(Q$)-K)
600 IFDONE=1THENCLOSE#1:PRINT"."
;:PRINT#2,Q$:CLOSE#2:PRINT:PRINT
"                      DONE":ENDELSE
NO=NO+1:GET#1,NO:Q$=Q$+A$
610 GOTO450
620 IFLEFT$(Q$,N)=CHR$(13)THENPR
INT#2," [":RETURNELSEPRINT#2,LEF
T$(Q$,N-1):RETURN
```

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480	77
580	175
END	222

Listing 6: MONROE

```
10 DIMA$(64)
20 A$(0)="
   Example:
30 A$(1)="
40 A$(2)="
50 A$(3)="ASCII File[
60 A$(4)="Historical Document[
70 A$(5)="To Desktop Screen
80 A$(6)="
90 A$(7)="
100 A$(8)="
110 A$(9)="
120 A$(10)="   To the House of R
epresentatives of the United Sta
tes:
130 A$(11)="
140 A$(12)="      By a resolution
 of Congress approved on the 27t
h of
150 A$(13)="March, 1818, it was
directed that the journal, acts,
 and
160 A$(14)="proceedings of the C
onvention which formed the prese
nt
170 A$(15)="Constitution of the
United States should be publishe
d, under
180 A$(16)="the direction of the
 President of the United States,
190 A$(17)="together with the se
cret journals of the acts and
200 A$(18)="proceedings, and the
 foreign correspondence (with a
certain
210 A$(19)="exception), of the C
ongress of the United States fro
m the
220 A$(20)="first meeting thereo
f down to the date of the ratifi
cation
230 A$(21)="of the definitive tr
eaty of peace between Great Brit
ain and
240 A$(22)="the United States in
 the year 1783, and that 1,000 c
opies
250 A$(23)="thereof should be pr
inted, of which one copy should
be
260 A$(24)="furnished to each me
mber of that (the Fifteenth) Con
gress,
270 A$(25)="and the residue shou
ld remain subject to the future
280 A$(26)="disposition of Congr
ess.
290 A$(27)="      And by a resolu
tion of Congress approved on the
 21st
300 A$(28)="April, 1820, it was
provided that the secret journal
,
310 A$(29)="together with all th
e papers and documents connected
 with
320 A$(30)="that journal, and al
l other papers and documents her
etofore
330 A$(31)="considered confident
ial, of the old Congress, from t
he date
340 A$(32)="of the ratification
of the definitive treaty of the
year
350 A$(33)="1783 to the formatio
n of the present Government, whi
ch were
360 A$(34)="remaining in the off
ice of the Secretary of State, s
hould be
370 A$(35)="published under the
direction of the President of th
e United
380 A$(36)="States, and that 1,0
00 copies thereof should be prin
ted and
390 A$(37)="deposited in the Lib
rary subject to the disposition
of
400 A$(38)="Congress.
410 A$(39)="      In pursuance of
 these two resolutions, 1,000 co
pies of
420 A$(40)="the journals and act
s of the Convention which formed
 the
430 A$(41)="Constitution have be
en heretofore printed and placed
 at the
440 A$(42)="disposal of Congress
, and 1,000 copies of the secret
450 A$(43)="journals of the Cong
ress of the Confederation, compl
ete,
460 A$(44)="have been printed, 2
50 copies of which have been res
erved to
470 A$(45)="comply with the dire
ction of furnishing one copy to
each
480 A$(46)="member of the Fiftee
nth Congress; the remaining 750
copies
490 A$(47)="have been deposited
in the Library and are now at th
e
500 A$(48)="disposal of Congress
510 A$(49)="     By the general
appropriation act of 9th April,
1818,
520 A$(50)="the sum of $10,000 w
as appropriated for defraying th
e
530 A$(51)="expenses of printing
 done pursuant to the resolution
 of the
540 A$(52)="27th of March of tha
t year.  No appropriation has ye
t been
550 A$(53)="made to defray the e
xpenses incident to the executio
n of the
560 A$(54)="resolution of 21st A
pril, 1820.  The whole expense h
itherto
570 A$(55)="incurred in carrying
 both resolutions into effect ha
s
580 A$(56)="exceeded by $542.56
the appropriation of April, 1818
.  This
590 A$(57)="balance remains due
to the printers, and is included
 in the
600 A$(58)="estimates of appropr
iation for the year 1822.  That
part of
610 A$(59)="the resolution of th
e 27th March, 1818, which direct
s the
620 A$(60)="publication of the f
oreign correspondence of the Con
gress of
630 A$(61)="the Confederation re
mains yet to be executed, and a
further
640 A$(62)="appropriation will b
e necessary for carrying it into
 effect.
650 A$(63)="
660 A$(64)="
    James Monroe]
700 OPEN"O",#1,"HISTDOC/TXT"
720 FORI=0TO64:PRINT#1,A$(I):NEX
T
730 CLOSE#1
```

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Broaden your online horizons using the create command

Creating Online

By Cray Augsburg
Rainbow Technical Editor

The `CREATE` command in Workspace can be very useful, as we learned last month. However, some of the benefits of building text files may not be readily apparent to the novice user. I am always discovering new ways to make the system work.

Writing Letters "Offline"

Keep in mind, a file in workspace is just that — a file. Delphi allows files to be in either text format (ASCII) or binary format. Source code falls under the text category, while an executable program is usually in binary.

In any case, let's suppose you want to send a letter describing some new CoCo fact you have discovered. You know you want to send it to one specific user, but it would be very time-consuming to type the letter over again should someone else want the information. We can use Workspace to help us save some time and effort. Use `CREATE` to write the letter in Workspace instead of writing it in Mail. When you have pressed `CTRL-Z` to save the letter in Workspace, you are ready to send it.

Just exit Workspace and go to Mail. At the Mail prompt, enter `SEND` *filename*, where *filename* is the name of the letter you wrote using the `CREATE` command. Delphi will respond with `To:`, just as if you were getting ready to write a new letter. However, after answering the expected prompts, you will not be given the usual opportunity to enter text. Instead, Delphi will send the file you specified with the `SEND` command to the username(s) supplied. And the file is stored in Workspace ready to be sent to anyone else you might choose at a later time.

Incidentally, there is another way to accomplish the above feat. Write your letter in Mail as usual, but send a copy of the letter to yourself as well by including your username at the `To:` prompt. Now when reading your new Mail messages, as soon as you have read the letter in question, enter `EXTRACT/NOHEADER` *filename*. This will cause the text of the letter to be saved in your Workspace under the name *filename*, and you can send the letter to other users as described.

Online APB's?

Let's say you and a bunch of your online cohorts form a little club in which you trade jokes via the Mail system. As the group grows, you notice it's getting harder and harder to type out all the group's usernames every time you want to send them all the same letter. After all, entering one or two usernames isn't too tedious, but seven or eight gets to be a real bummer. A distribution list can really help us here.

Go to your Workspace and enter `CREATE` *filename*`.DIS`. The filename can be any descriptive name you choose (a good one for this example might be

---

Cray Augsburg is RAINBOW's technical editor and has an associate's degree in electrical engineering. He and his wife, Ruth Ann, have two children and live in Louisville, Kentucky. His username on Delphi is CRAY.

Database Report

By Don Hutchison
Rainbow CoCo SIG Database Manager

Through the kindness of **James Farmer** (MODEMMASTER), we now have over 20 digitized pictures online of the people attending the Chicago RAINBOWfest! You'll find these DS-69B pictures in the CoCo 3 Graphics topic of the database. Included are pictures of these notables: Lonnie and Willo Falk; Marty Goodman; Steve Bjork; Dale Lear; Kip Bryan of Delphi; Belinda Kirby, Kim Vincent, Cray Augsburg, Wendy Falk, and Donna Shuck of THE RAINBOW; and such commercial vendors as Burke & Burke, Computer Plus, Speech Systems, Tom Mix, Granite Computer Systems, Howard Medical, Cer-Comp and Diecom. Thanks, James!

OS-9 Online

Of General interest is **Chris Burke** (COCOXT) who uploaded his fifth *Application Note* with many hard disk installation tips and information on Burke & Burke products.

In the Utilities topic of the database, **Rick Adams** (RICKADAMS) posted `LS`, a public domain directory listing utility similar to the UNIX `LS` command. **Warren Moore** (WJMOORE) posted his popular *Wmode* program, which can save and restore window attributes in memory and can also change colors and palette registers. (The assembly source files are included.) **Bruce Isted** (BRUCEISTED) posted a revision to his MS-DOS/RS-DOS to OS-9 transfer utilities, courtesy of Bob Santy. (`PCDOS.AR` was updated 6/9/88 and `RSDOS.AR` was updated 6/22/88 to correct some bugs, particularly ones pertaining to 80-track drives.) Bruce also posted `WAIT`, a screen saver/blanker utility. **Mike Knudsen** (RAGTIMER) uploaded `SIZEFIX`, a utility in BASIC09, to modify the size or length of a disk file. **Bert Schneider** (OS-9BERT) posted `AIFGEN`, a BASIC09 utility that helps create AIFs for OS-9 Level II on a CoCo 3. The AIFs are used by *Multi-Vue* to identify icons, screen type, and memory modifiers. **Brian Wright** (POLTERGEIST) uploaded `SORTDIR`, a "pure vanilla" directory sort utility. Brian also sent us a window disk utility and a disassembler.

Ken Schunk (KENSCHUNK) posted a modified SCF driver in the Device Drivers topic of the database. Ken's driver can properly handle non-sharable devices, such as the printer (/p).

The Patches topic gives us **Jerry Yates** (BAGMAN) who uploaded `CC3GO.PAT`, a text file that allows those using the Burke & Burke XT-ROM to patch the *CC3go* module and use an alternate startup and/or autoex file.

In the Telcom topic, **John Beveridge** (JOHNTORONTO) uploaded `JTERM`, a Level II terminal program that supports YModem, XModem-checksum and XModem-CRC. **Merle Kemmerly III** (TOOK3) posted `TELSTAR`, a terminal program for the CoCo 3 that features pull-down menus. **Ron Bihler** (RAAB) uploaded an ARCed file containing various patches and fixes for the *RiBBS* system. **Bill Brady** (OS9UGED) uploaded the "official" *Wiz* icon and AIF set, and preliminary documentation for *Wiz Pro*.

In the Graphics & Music topic, **Dennis**

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Weldy (OS9ER) uploaded `QUADDUMP`, a utility for printing a Hi-Res VEF image from `stdin` on a Quadram Quadjet printer. **Mike Veal** (LVEAL) uploaded his version of the Mandelbrot set. **Kevin Darling** (KDARLING) uploaded his fix for the "`VDGINT` blip," the infamous flowing waterfall demo and viewer program, and a CAD-like picture of the space shuttle, modified using his *Gfx* editor. Kevin also posted sixteen icons for *Multi-Vue* and a humorous "Meep" sound module. **Bob Montowski** (GRAPHICSPUB) uploaded some D&D "Clip Art" as well as some erotic "Clip Art" for CoCo 3's *Home Publisher.* **Mike Knudsen** (RAGTIMER) posted a patch to fix a bug in the new (6/8/88) version of *UltiMusE.* Mike also posted a piano music file called `NOLA.UME` (version 1.1.1 of his *Umuse* program), two scores for *Umuse* called *Gabrieli* and *Naiarag*, and a hints file for getting the most use out of the *UltiMusE* music score editor and MIDI player.

The Programmers Den gives us Brian Wright's file with two C source files: `DES.C`, a utility to encrypt files, and `BACON.C`, a tutorial program.

CoCo SIG

At the request of a SIG member, **Dick White** (DICKWHITE) posted the constitution for the Cincinnati Tandy Users Group in the General topic of the database. **Gary McCarty** (BANDMAN) uploaded an index for the 1983-84 issues of *Color Computer*, and **Zack Sessions** (ZACKS) provided a file discussing computer "viruses."

In the CoCo 3 Graphics topic, **John Barrett** (JBARRETT) uploaded a picture of a nude woman on a bearskin rug and some digitized pictures from "Lost In Space." **Bob Wharton** (BOBWHARTON) posted his drawings of the "Miami Vice" logo, a *Garfield* cartoon, and several humorous pictures admonishing others not to use *other* computers. **Eric Robichaud** (EGROBICHAUD) uploaded an ARCed file containing an MGE viewer utility for those using MS-DOS machines. (The MS-DOS programs called *PkxArc* or *Arc* are re-

---

`JOKELIST`). The extension, however, must be `.DIS`. This lets Delphi know the file is really going to be used as a distribution list, a list of several usernames to whom you want to send a single piece of Mail.

When Delphi is ready for you to create the file, simply type the usernames in question, making sure to press ENTER after each one. It is important that each username is spelled correctly and that there is only one username on each line of the file. When you have entered the list, press CTRL-Z and Delphi will save the list in Workspace.

To send a joke to all of these people at once, enter `SEND` at the Mail prompt. If you have already entered your joke using `CREATE`, enter `SEND` *filename*. When Delphi responds with `To:`, enter `@JOKELIST`. You need not include the extension, but you must precede the filename with the @ sign. Enter your letter as you desire; when you press CTRL-Z to finalize the send, your joke will be sent to all the usernames listed in the `JOKELIST.DIS` distribution list. As the group grows, you can add new members to the list by simply editing the file in Workspace. You can also take usernames off the list in the event that someone doesn't laugh at one of your jokes. And you can apply this same technique to many other applications as well.

The SIG staff uses distribution lists liberally. And while I understand the need may not be as prevalent among individual users, the example shows one application where it can be used.

Simpler Workspace Directories

Last month, I described how to get a directory of Workspace using the `DIR/EXCLUDE*.MAI` option. This command line will show you a directory of all Workspace files with the exclusion of Mail files and folders (those having the `.MAI` extension.) It seems I have been going the long way about it — there is an easier way! Simply enter `DIR/NOMAIL`, which will accomplish the same thing. Of course the `/EXCLUDE` option is still quite useful in other situations.

Another option for the `DIR` command is `DIR/A`. This option gives an abbreviated directory listing in which all the information regarding file size, etc., is left out. Each file in the directory listing will be on a separate line. Obviously, such a listing will go much more quickly depending on the number of files you have in your Workspace.

Another handy feature is that these options can be combined. You can enter `DIR/A/NOMAIL` to get an abbreviated directory and still exclude the Mail files. `DIR/A/EXCLUDE*.TXT` produces a directory excluding any file with an extension of `.TXT`.

Wildcards

You might have noticed in this and last month's Delphi Bureau that some of the command lines include an asterisk. This asterisk is known as a *wildcard* character. It is something many CoCo users are not aware of because wildcards are not directly supported by Disk BASIC or even OS-9.

A wildcard causes a Workspace command to act on many related files in the same way. The asterisk is used simply to replace "unknown" parts of the filename. For instance, if you want to get a directory of only those files with a `.TXT` extension, enter `DIR *.TXT`. The asterisk tells Delphi that you don't care what the first part of the filename is. You can break this down even further. If you have several files in Workspace with `MEMO` as the first four characters of the regular filename, you might enter `DIR MEMO*.*` to get a directory.

Obviously, these wildcards offer a great deal of power to the user. If you want to delete all text files in your Workspace, you might enter `DEL *.TXT`. On the other hand, use of wildcards with a destructive command such as `DELETE` can be dangerous. I urge you to use it cautiously.

CREATE Revisited

I want to mention some aspects to the Workspace `CREATE` command that have not been covered. First, you can use the standard Delphi commands while using `CREATE`. For instance, pressing CTRL-X or CTRL-U will cause Delphi to cancel the current line (any text typed since the last time you pressed ENTER). Similarly, CTRL-R will cause Delphi to redisplay

---

One-Liner Contest Winner . . .

This short program converts fractions to their decimal counterparts.

The listing:

```
1 CLS:PRINT:PRINT"  NUMERATOR":P
RINT"-----------":PRINT"DENOMINA
TOR":PRINT:INPUT"INPUT NUMERATOR
  ";A:PRINT"                  --
-":INPUT"INPUT DENOMINAT0R";B:D=
(1/B)*A:PRINT@330,A;"/";B;"=";:P
RINTUSING".#####";D
```

Charles A. Kiedaisch
Mokena, IL

(For this winning one-liner contest entry, the author has been sent copies of both *The Third Rainbow Book of Adventures* and its companion *The Third Rainbow Adventures Tape.*)

quired to unARC these MS-DOS files; *TC*, as used on the CoCo, will not work.) **John Britton** (SCIROCCO) uploaded several pictures from the series, "Star Trek, the Next Generation." **Billy Hambric** (SNOOPYDOG) uploaded some more of his popular *MGE* graphics, and **Richard Trasborg** (TRAS) uploaded an ARCed file containing a collection of popular utilities for use with CoCo 3 pictures.

In Utilities and Applications, **Alan DeKok** (ALANDEKOK) posted patches to allow faster writing on the CoCo 3's Hi-Res screens and a utility for utilizing the Hi-Res adapter from Tandy. **David Mills** (DAVIDMILLS) posted a utility to allow disk users to hear the data transfer to/from disk in much the same way as allowed by the BASIC command `AUDIO ON`. **Larry Binenfeld** (MRBASIC) uploaded a set of patches for *EPZAP* from Michtron, which allows operation on 40-track, 6-ms drives (either single- or double-sided). **Marc Genois** (MARCGENOIS) uploaded a disk label program for the Tandy DMP-130. **Richard Ortman** (RAO) posted *CoCoLog*, a cataloging system.

(RUHNOW) uploaded a Hangman game for the CoCo 3 in the Games topic of the database.

In the Classic Graphics topic, John Barrett posted three pictures of the group, The Bangles.

The Music & Sound topic includes **Mike Carey** (SPOOLFRAME) who uploaded sixteen *Lyra* music files for the enjoyment of SIG members; **Mark Raphael** (MARKRAPHAEL), who posted an *ARCed file* containing several of his favorite Orchestra-90 tunes; and **Mike Stute** (GRIDBUG), who uploaded three musical selections as well.

In Product Reviews & Announcements, Richard Trasborg posted Mike Trammell's review of *MAX-10*, the new word processor and document creator for the CoCo 3.

Data Communications gives us **Joe Josey** (COCOJOE) who uploaded a text file describing a hardware modification to a modem, which allows it to detect the different incoming baud rates.

See you online on Delphi! ☐

the current line on your screen. This command can be very useful if someone should send you a message while you are in the middle of writing a file.

Second, slash commands *do work* in the `CREATE` mode. In other words, if you are in the middle of creating a file and want to know what time it is, just enter `/T` at the beginning of a line (all slash commands must start at the beginning of a new line of text). The `/SEND` command works very well in this situation. The problem this might cause is if you want to start a line of text in the file with a slash. Delphi will think you want it immediately to execute the command, which is really just a line of text. The solution to this problem is to precede any such line with two slashes. To have the line `/FIRST LINE ON TEXT` appear in the file, you must enter it as `//FIRST LINE OF TEXT`.

I hope the information I have presented here will help you gain a little more use out of your online time. I also want to spark your interest (OK, I'm really looking for a raging inferno!) in the many ways Delphi can be used to your advantage, whether you use it for business purposes or personal pleasure. The more we know about something, the less fearful we are of it. And it is not difficult to overcome the challenge Delphi presents to many users. It only takes a little time and effort.

Join me next month as I delve into the workings of the Workspace `EDIT` command. Better yet, delve into it yourself and learn!

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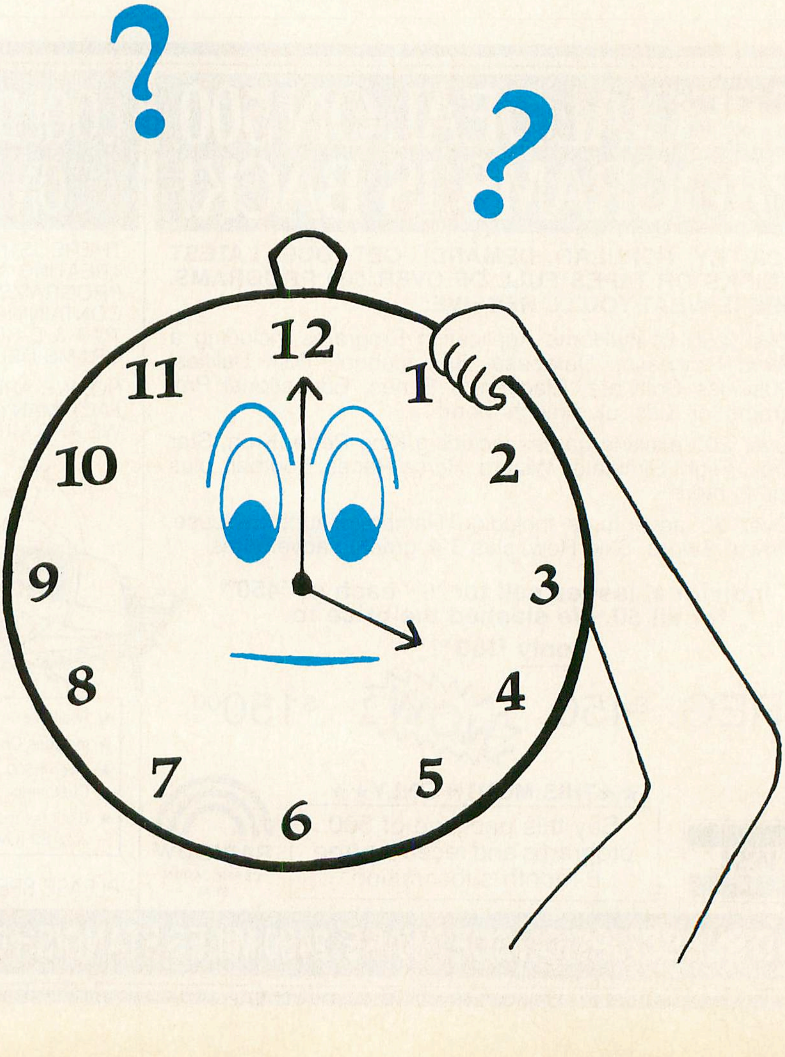
Calculating time intervals for VCR tape

On VCR Time

By Fred Hair, Jr.

Have you ever picked up a partially used video cassette and wondered how much recording time is left on it? The video tape counter on the recorder indicates that the last recorded segment ends at 3640, but what does this number measure? Video tape cassettes are manufactured in standard sizes and labelled according to the amount of recording time available on each cassette. It would be convenient to have a tape counter which indicated elapsed time. Unfortunately, this is not the case. Modern VCR tape counters are electronic event counters which receive their input from the spindle driving the take-up reel in the cassette. The tape count is a measure of the number of revolutions made by the take-up reel. The counter is a convenient and simple way to mark the beginning and the end of a recording segment. With a little programming expertise and the use of your CoCo, these numbers can be used to determine the running time of the tape segment.



Fred Hair holds a B.S. degree in Physics. He is an instrument technician specializing in the installation and servicing of industrial process control equipment.

The BASIC program, *Video Timer*, is designed to perform this task.

Video Timer was written in BASIC for the CoCo 2 and was developed for VHS VCRs using T-120 video cassettes. The tape counter should range from 0 to approximately 5800 over the length of the cassette. If your VCR meets this specification, then the program may be used without modification. If not, the section on program theory will show you how to modify the program to meet your needs.

> *"The tape count is a measure of the number of revolutions made by the take-up reel."*

Let us solve the following problem to demonstrate the use of program. You have a video cassette on which the last recorded segment ends at count 4620. The counter indicates the end of the tape at 5820. You want to know how much recording time is available at medium speed. Load `VIDTIME` and execute. The program begins by prompting:

```
INPUT TAPE SPEED
     F FOR FAST
     M FOR MEDIUM
     S FOR SLOW
 ?
```

Enter M for medium speed. Entering any character other than an F, M, or S, terminates the program. [If you have a VHS VCR, use 'F' for the SP speed, 'M' for LP and 'S' for EP or SLP. For Beta, use 'F' for Beta I or X1, 'M' for Beta II or X2 and 'S' for Beta III. On 8mm recorders, use 'F' for SP (or if there is only one speed) and 'M' for LP.]

The program will then prompt: `COUNT 1 = ?`. This is the number indicating the beginning of the tape segment. Enter 4620. The program then prompts `COUNT 2 = ?`. This is the counter number at the end of the tape segment. Enter 5820. The program will respond with `TIME INTERVAL = 71 MINUTES`. There are 71 minutes of running time at medium speed left on the tape. The program will then return to the initial prompt.

Program Theory

Video information is encoded on magnetic tape by a cylindrical, rotating magnetic head. The tape must be pulled across the head at a constant speed. As the diameter of the tape spool on the take-up reel in the cassette increases, the frequency of rotation of the take-up reel decreases. The number of tape counts per unit time also decreases. A graph of tape running time versus counter number will represent a curve that may be defined by the quadratic equation:

$$T = AX^2 + BX + C. \qquad \text{Eq. 1}$$

where T is the elapsed time since the beginning of the tape; X is the counter number; and A, B, and C are constants to be determined. Let X1 be the number indicating the beginning of a tape segment. Placing this in Equation 1 yields:

$$T1 = AX1^2 + BX1 + C. \qquad \text{Eq. 2}$$

Let X2 be the counter number indicating the end of a tape segment. Equation 1 would then yield

$$T2 = AX2^2 + BX2 + C. \qquad \text{Eq. 3}$$

The running time of the tape segment will be T2 minus T1, or

$$T = T2 - T1 = A(X2^2 - X1^2) + B(X2 - X1), \qquad \text{Eq. 4}$$

where T is now the running time of the tape segment between the counter X1 and X2.

So far, so good. But modern VCRs are capable of operating at fast, medium and slow speeds. Medium speed in one half of fast speed, and slow speed is one third of fast speed. If we let Equation 4 represent running time at fast speed, we can write:

$$TF = A(X2^2 - X1^2) + B(X2 - X1) \qquad \text{Eq. 5}$$

$$TM = 2T \qquad \text{Eq. 6}$$

$$TS = 3T \qquad \text{Eq. 7}$$

where TF, TM, and TS are the running times at fast, medium, and slow speeds respectively. All that remains is to determine the value of the constants A and B.

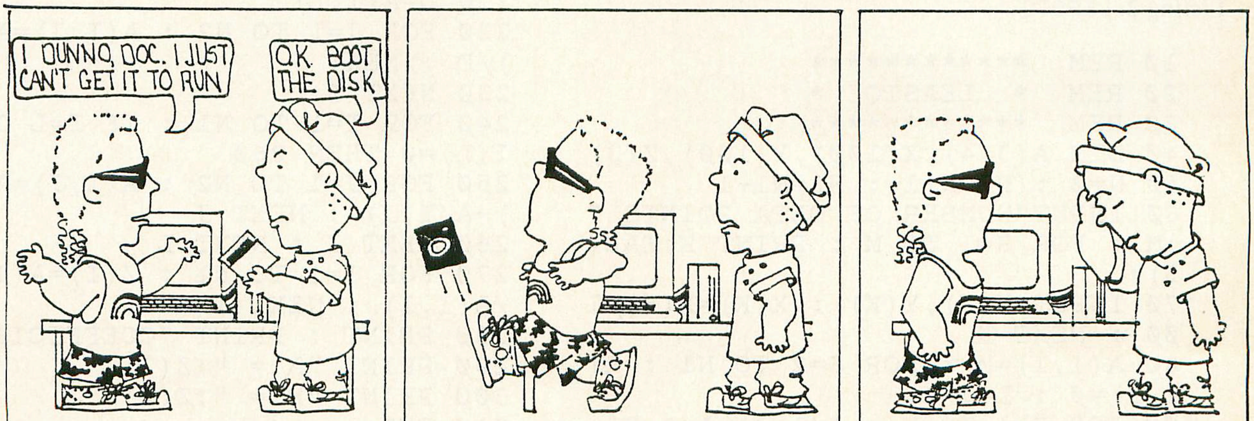
Equation 1 defines the curve which represents the relationship between running time and tape counter indication. Given a set of points which lie on the curve, there are several mathematical techniques for determining the constants A and B. I have selected a method based on the Principle of Least Squares, as given in program `LEASTQ`. (See Listing 2.)

A detailed discussion of the Principle of Least Squares may be found in many introductory texts on numerical analysis, such as *Methods In Numerical Analysis* by Kaj L. Nielsen.

Select a video tape from your tape library. Its entire length should be recorded at fast speed. Use a rented prerecorded tape only if you are certain it is recorded at fast speed and is a full two hours long. Make sure the cassette is fully rewound, reset the tape counter on your VCR, insert the cassette, and press the play button. Write down the initial counter number (zero) and the initial time in minutes (also zero). Continue to write down the counter number and elapsed time every ten minutes or so. It

Dr. Nibble

By Kelly Taylor


I DUNNO, DOC. I JUST CAN'T GET IT TO RUN.
O.K. BOOT THE DISK
Taylor

is not necessary that the measurements be taken at exact ten minute intervals. You might take one measurement at nine minutes, another at twenty-one minutes, another at thirty-two, etc. Simply be sure you record the count measurement as close to the minute as possible. The following chart was made with my RCA VCR using a T-120 video cassette:

	Counter Number	**Elapsed Time (minutes)**
1.	0	0
2.	857	10
3.	1541	20
4.	2128	30
5.	2651	40
6.	3126	50
7.	3566	60
8.	3976	70
9.	4365	80
10.	4732	90
11.	5080	100
12.	5414	110
13.	5735	120
14.	5804	122

Now load `LEASTQ` and begin execution. The program prompts `NUMBER OF DATA POINTS?` Enter the number of data points, in this case 14. The program will then prompt for the first data point. State the counter number, followed by a comma, then the time. Press ENTER. The program will then prompt for the second measurement. Continue in this manner until all measurements have been entered. The program will then proceed to calculate and display the constants A and B:

```
A = .0188418559
B = 1.01131207
```

These are the constants which define equations 5 through 7. Because *Video Timer* uses equations 5 through 7 to compute the time intervals, the constants A and B must be defined in line 40 of the program.

The listings for `VIDTIME`, and `LEASTQ` are given in BASIC. Computer memory requirements are modest (less than 8K for each program), the programs are unpretentious and simple in structure; there should be no difficulty in modifying them for use with other systems. Use the programs to gauge your tape-time on any video recording, and never lose the end of another television film or show.

(Questions or comments regarding these programs may be directed to the author at 1314 Kim Street, Sulphur, LA 70663. Please enclose an SASE when requesting a reply.) □

Listing 1: `VIDTIME`

```
 10 REM  *************
 20 REM  *  VIDTIME  *
 30 REM  *************
 40 A = .0188418559 : B = 1.01131
 207
 50 PRINT"INPUT TAPE SPEED" : PRI
 NT"   F FOR FAST" : PRINT"   M F
 OR MEDIUM" : PRINT"   S FOR SLOW
 "
 60 INPUT Q$
 70 IF Q$="F" THEN D=1 : GOTO 110
 80 IF Q$="M" THEN D=2 : GOTO 110
 90 IF Q$="S" THEN D=3 : GOTO 110
 100 END
 110 INPUT"COUNT 1 = ";X1 : X1=X1
 /100
 120 INPUT"COUNT 2 = ";X2 : X2=X2
 /100
 130 Y=D*(A*(X2*X2-X1*X1)+B*(X2-X
 1))
 140 PRINT"TIME INTERVAL = ";INT(
 Y);" MINUTES" : GOTO 50
```

Listing 2: `LEASTQ`

```
10 REM  ************
20 REM  *  LEASTQ  *
30 REM  ************
40 DIM A(3,4),X(100),Y(100),Z(3)
50 N=2 : N1=N+1 : N2=N1+1
60 INPUT"NUMBER OF DATA POINTS "
;M : FOR K=1 TO M : PRINT K;TAB(
5);
70 INPUT X(K),Y(K) : X(K)=X(K)/1
00 : NEXT K
80 A(1,1)=M : FOR J=2 TO N1 : A(
1,J)=0 : L=J-1
90 FOR K=1 TO M : A(1,J)=A(1,J)+
X(K)^L : NEXT K : NEXT J
100 FOR I=2 TO N1 : FOR J=1 TO N
1 : A(I,J)=0 : L=I+J-2
110 FOR K=1 TO M : A(I,J)=A(I,J)
+X(K)^L : NEXT K : NEXT J : NEXT
 I
120 A(1,N2)=0 : FOR I=1 TO M : A
(1,N2)=A(1,N2)+Y(I) : NEXT I
130 FOR K=2 TO N1 : A(K,N2)=0 :
L=K-1
140 FOR I=1 TO M : A(K,N2)=A(K,N
2)+X(I)^L*Y(I) : NEXT I : NEXT K
150 FOR L=1 TO N1 : IF A(L,L)<>0
 THEN 200
160 IF L>=N1 THEN 190
170 H=L+1 : FOR I=H TO N1 : FOR
J=1 TO N2
180 A(L,J)=A(L,J)+A(I,J) : NEXT
J : NEXT I : IF A(L,L)<>0 THEN 2
00
190 PRINT"NO SOLUTION POSSIBLE."
 : STOP
200 FOR I=1 TO N1 : IF A(I,L)=0
THEN 230
210 D=A(I,L)
220 FOR J=1 TO N2 : A(I,J)=A(I,J
)/D : NEXT J
230 NEXT I
240 FOR I=1 TO N1 : IF I=L OR A(
I,L)=0 THEN 260
250 FOR J=1 TO N2 : A(I,J)=A(L,J
)-A(I,J) : NEXT J
260 NEXT I : NEXT L
270 FOR I=1 TO N1 : Z(I)=A(I,N2)
/A(I,I) : NEXT I
280 PRINT : PRINT "COEFFICIENTS"
290 PRINT "A = ";Z(3)
300 PRINT "B = ";Z(2)
310 END
```

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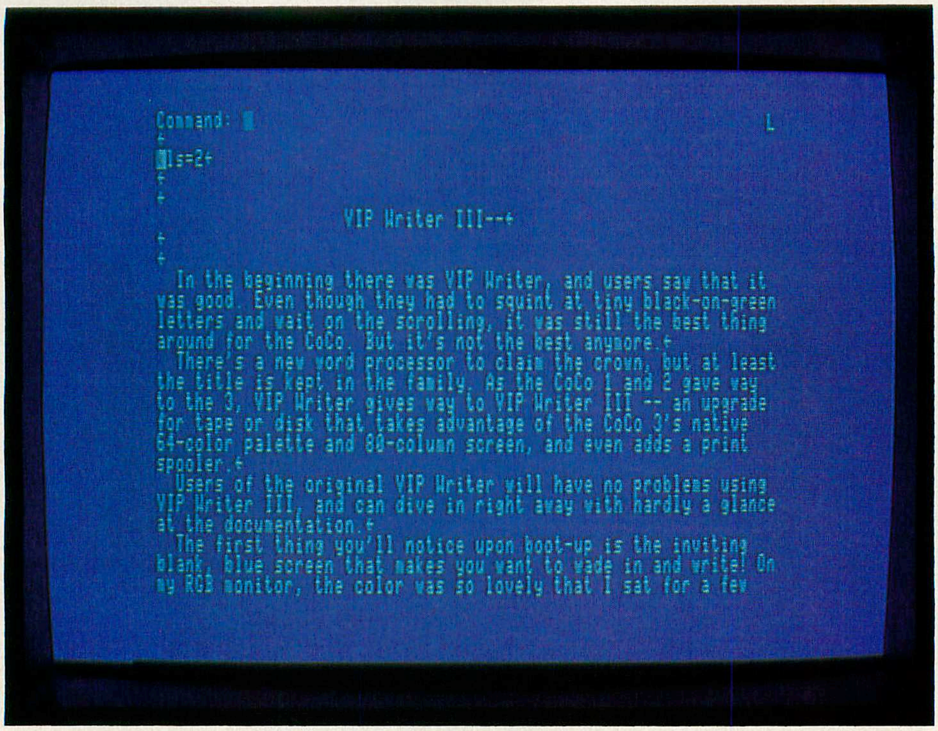


```
Command: █                                                         L
←
█ls=2←
←
←
                     VIP Writer III--←
←
←
  In the beginning there was VIP Writer, and users saw that it
was good. Even though they had to squint at tiny black-on-green
letters and wait on the scrolling, it was still the best thing
around for the CoCo. But it's not the best anymore.←
  There's a new word processor to claim the crown, but at least
the title is kept in the family. As the CoCo 1 and 2 gave way
to the 3, VIP Writer gives way to VIP Writer III -- an upgrade
for tape or disk that takes advantage of the CoCo 3's native
64-color palette and 80-column screen, and even adds a print
spooler.←
  Users of the original VIP Writer will have no problems using
VIP Writer III, and can dive in right away with hardly a glance
at the documentation.←
  The first thing you'll notice upon boot-up is the inviting
blank, blue screen that makes you want to wade in and write! On
my RGB monitor, the color was so lovely that I sat for a few
```

Software CoCo 3

VIP Writer III — Setting the Standard

In the beginning there was *VIP Writer*, and users saw that it was good. Even though they had to squint at tiny black-on-green letters and wait on the scrolling, it was still the best thing around for the CoCo. But it's not the best anymore.

There's a new word processor to claim the crown, but at least the title is kept in the family. As the CoCo 1 and 2 gave way to the 3, *VIP Writer* gives way to *VIP Writer III* — an upgrade for tape or disk that takes advantage of the CoCo 3's native 64-color palette and 80-column screen, and even adds a print spooler.

Users of the original *VIP Writer* will have no problems using *VIP Writer III*, and can dive in right away with hardly a glance at the documentation.

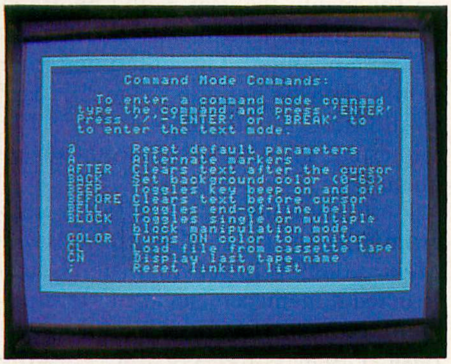
The first thing you'll notice upon boot-up is the inviting blank, blue screen that makes you want to wade in and write! On my RGB monitor, the color was so lovely that I sat for a few moments just staring at the screen. What a delightful change from the generic CoCo green! But if the default blue screen does not serve as your muse, you have CoCo 3's palette of 63 colors (64, counting black) to choose from for background and text — that's 4,032 possible combinations if my memory of statistics serves me right. Surely one of those combinations would appeal to any user (personally, I prefer the default white-on-blue display). A configuration program supplied allows you to modify *VIP Writer III* so that it boots up with your chosen defaults.

The second thing you'll notice is the faster scrolling speed. Traveling up and down screen pages, and to and from the top and bottom of a document is nearly instantaneous. Old *VIP Writer* users won't believe the pep. It came as a pleasant surprise to me.

When it comes time to print out, you'll notice the print spooler, which has increased in size in the latest edition of *VIP Writer III* from 49,000 to 57,000 characters. This means you won't have to sit twiddling your thumbs while your 20-page magnum opus prints out so *slowly* on your dot matrix printer.

While one document is being printed out, another can be called up and edited.

These three enhancements (color, speed and spooler) are the only major differences between *VIP Writer III* and the older version. SD Enterprises' Paul Anderson said that the program is "now 100 percent compatible with RGB computer systems, RGB DOS and hard disk." He added, "This is the key to using *VIP Writer III* with double-sided drives, faster stepping rates and up to two hard disks."



```
Command Mode Commands:

   To enter a command mode command,
type the command and press 'ENTER'
Press '/'-'ENTER' or 'BREAK' to
to enter the text mode.

a       Reset default parameters
A       Alternate markers
AFTER   Clears text after the cursor
BACK    Set background color (0-63)
BEEP    Toggles key beep on and off
BEFORE  Clears text before cursor
BELL    Toggles end-of-line bell
BLOCK   Toggles single or multiple
        block manipulation mode
COLOR   Turns ON color to monitor
CL      Load file from cassette tape
CN      Display last tape name
;       Reset linking list
```

The *VIP* commands still hinge on the CLEAR key: Commands in text mode are issued with a CLEAR key combination; a double press of the CLEAR key still moves the user from the text mode into the command mode. The window mode has not changed.

One disadvantage of a command-oriented program like *VIP* is that the commands sometimes just don't make a lot of sense (e.g., CLEAR-G is *VIP*'s "undo" command). However, an advantage of such programs is their speed of operation — once you learn the commands. If you're into just plain-vanilla word processing (as am I), *VIP Writer III* (and the original program) treats you kindly. Only if you dig into the more esoteric functions and commands will you have to do a lot of memorizing. I stick pretty much with disk I/O, deletion and cursor movement commands, leaving header, footer and formatting commands alone. The default formats are fine for me.

My one *big* gripe with *VIP Writer*, both old and new, is its save command. When you invoke the command, only what follows the cursor is saved. This means that to save a document whole you must travel to its beginning. If you make frequent saves (and it is advised that you do!), this can become a pain. Several times I have tapped the final keystrokes of a document and blithely saved what I thought was the whole document — but which turned out to be

The Company Behind VIP

SD Enterprises acquired all the rights to the *VIP* library of Color Computer products from VIP Technologies in November 1986. SDE owner Paul Anderson said, "We were offered the products and jumped at the chance to obtain them as we knew they were superior products with a recognized brand name."

In March 1987, SD Enterprises offered upgrades to the *VIP* stand-alone products to allow them to run on the CoCo 3 as they did on the 64K CoCo 1 or 2. The *VIP Integrated Library* needed no upgrade as it ran on the CoCo 3 without any modifications.

SDE continued to sell *VIP* products through Tandy Express Order, and Anderson decided to advertise in THE RAINBOW. Pleased with the response regarding the "revival of the *VIP Library*," Anderson said he "decided to rewrite the *VIP* products to take advantage of the CoCo 3's increased speed, memory and hardware screen display."

The first product released specifically for the CoCo 3 is *VIP Writer III*. Anderson said he was amazed at how fast it worked. "*VIP Writer III* ran as fast or faster than IBM word processors we've used."

Anderson, who worked on program-

Word Processors: The Ultimate in Procrastination Technology

There's a saying that the process of writing is easy — you just load a piece of paper into a typewriter and stare at the blank white page until droplets of blood appear on your forehead. Another saying insists that whatever amount of time you have to complete a job, that's how much time it takes.

At the root of both of these sayings is the matter of procrastination, a state of metabolic-overdrive, ulcer-inducing madness — and an art form in itself.

From my observations working here at THE RAINBOW, I have discovered this absolute — there can be no procrastination without deadlines. You cannot have one without the other — it would be like having peanut butter without jelly, spaghetti without meatballs. (What, me procrastinate? I *always* begin an assignment at least three hours before it's due.)

These observations give new meaning to the party line depicting computers as time- and labor-saving devices. They are, they really *are*. But human nature plugs itself into the equation in the most unpredictable ways.

Think back to your pre-word processing high school or college days when having a term paper due on Monday meant sweeping through the library on Friday night, hastily scribbling and rescribbling rough drafts all through Saturday, and finally tracking down a typist who just might be able to bring order to your handwritten chaos on Sunday night.

Now think how different it would be if you could do it all again — this time using your word processor. Why, you could wait until Sunday afternoon to get started!

Of course, the library rush would not change (unless you were fortunate enough to be connected to an online database), but the note-taking procedure can be performed within the word processor. From there, with your trusty word processor's cut-and-paste ability, you can move seamlessly through the rough draft phase and flow into the finished product. Run the spelling checker on the final document, print out on a letter-quality printer, and your professor will be so pleased he'll give you an A, right? (One can hope. I have a nagging suspicion that professors are beginning to catch on to word processing.)

I've found that word processors can be of help in other labor-saving ways. For example, paper-wadding is no longer required. (Paper-wadding is generally a dangerous activity for those under deadline, because it invariably leads to an impromptu basketball game with the trash can.)

They can also eliminate the forehead-slaps and wistful "Oh, yeah" that accompanies the realization that one has left out several vital sentences in the thesis paragraph of a carefully hand-typed paper. With word processing, reprints are not a problem. And neither are word counts! You'll never have to write a word over what you were assigned.

But I don't think we've yet reached the zenith of this procrastination technology. I'm waiting for the day when speech digitizing computers can take dictation and zip out a hard copy the second I shut my mouth.

Now, if *you'll excuse me*, it's 3 a.m. Monday, and I'm going to need a little sleep if I'm to hand this in by 9. ☐

ming the original *VIP Writer*, said he is encouraged by the speed and capabilities of the CoCo 3 and plans to rewrite the rest of the *VIP* products to take full advantage of them.

According to Anderson, *VIP Database III* will have been released in July, and will feature the following: support for 40-, 64- and 80-column screens; double clock speed; and a print spooler added to the report generator. He also said that *VIP Calc III*, *VIP Speller III* and *VIP Terminal* will be completed in the fall. All will support 32-, 40-, 64- and 80-column screen size and double clock speed. He said *Calc's* spreadsheet size will be increased and that *Speller's* spell checking will be performed in memory for maximum speed.

"When we are finished, we will have a very powerful package," he concluded ☐

nothing! In *VIP's* defense, the post-save response on the command line read "part saved," signifying that I had saved only a part of the document.

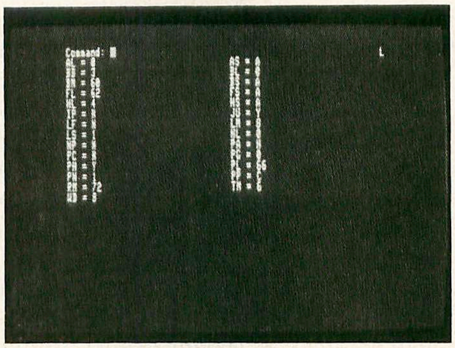
I have two *little* gripes. The first little gripe concerns the way *VIP* handles type-overs of more than one line in the overstrike mode — it creates lines between lines. Once you have finished with your additions you must delete all the text beyond that first line. The second little gripe many of you may not find relevant (especially if you have never flexed your fingers over the keyboard of an IBM-compatible like the Tandy 1000) — the lack of a backspace key. I admit I may be spoiled, but I prefer to backspace rather than back up and delete.

The documentation for *VIP Writer III* comes in the form of the original *VIP Writer* manual and a four-page addendum listing all the new commands and features. As in the older version, there is a help screen.

I saved the best for last! The *VIP Writer III* program I received came packaged with *VIP Speller*. The word processor is on Side 1 of the disk and the spell checker is on Side 2. Spell checking makes editing and proofreading a heckuva lot easier! The program maintains a dictionary of a respectable 50,000 words, and the user can create a number of personalized auxiliary dictionaries.

VIP Speller requires only a disk drive and 32K ECB — which means that it can be used with the original *VIP Writer*. It can also perform a spell check on practically any file that's saved in ASCII. I will be using *VIP Speller* on this review; a copy editor and a proofreader will clean up behind me. If you find a misspelling in this review, I don't want to hear about it!

If you are in the market for a CoCo 3 word processor, you should definitely look into *VIP Writer III*. If you own a CoCo 3 and a copy of the original *VIP Writer*, you should consider upgrading.



(SD Enterprises, P.O. Box 1233, Gresham, OR 97030, 503-663-2865; $79.95 for disk, $59.95 for tape; $34.95 for *VIP Speller*; add $3 for S/H)

— Lauren Willoughby

Software CoCo 3

Multi-Menu — A Custom Menu System under *Multi-Vue*

Multi-Menu is a very user-friendly program for creating custom menus under *Multi-Vue*. Until now, to use a utility program or OS-9 command from *Multi-Vue*, the user had to either write his own AIF file, find the program in the commands directory (this can get tiresome if the directory is very large) and open it from the Files menu, or get a shell and type it in the old-fashioned way. Now, after the quick construction of a menu, all of your most-used commands and utilities can be accessed by a simple pull-down sequence.

Multi-Menu requires a 512K CoCo 3, OS-9 Level II and *Multi-Vue*. It comes with an 11-page instruction manual that explains how to get started by making a backup and copying the *Menu* files to the *Multi-Vue* disk. Once this is completed, the user is ready to start creating menus.

After double-clicking on the icon, the program takes over and prompts the user for all the information needed. The program is so user-friendly that I only really needed to look at the instructions for one thing — how to enter commands. Along with entering anything that could normally be entered at the OS-9 prompt, the user can have the program request parameters by entering a prompt surrounded by percent signs.

For example, if the user wanted the `Ident` command to be in his menu, he could type `ident %Enter Filename%` as the command for that menu option. Then, after selecting the `Ident` option on the menu, the user would be asked for the filename with an "Enter Filename:" prompt. The command line would then be executed, and the user would see the statistics for the file requested, all with a simple menu sequence.

I use my computer mostly for programming and so wondered how *Multi-Menu* could help me to write. I constructed a menu screen called Development containing four menus titled Basic, Pascal, C and Assembly. Clicking on the C menu bar pulls down a menu with three options — Edit, Compile and Execute.

The Edit option prompts me for a filename and then calls up *Scred* (an OS-9 screen editor). After I've edited the program, I exit *Scred* and I'm back at the menu screen. I then pull down the C menu and click on the Compile option. The program again prompts me for a filename, which it proceeds to compile. Finally, I click on the Execute option to test the program. If it's not right, I can go back to the editor. This seems to greatly increase productivity and makes the rather old-fashioned OS-9 C compiler perform like Borland's *Turbo C*.

As nice as it is, however, *Multi-Menu* is not perfect. The first thing I noticed was that the cursor is constantly hanging around the screen. This, of course, is not a problem, but I find it annoying to see the cursor sitting in the corner of the screen and of any dialog box that pops up. It seems that this could have been eliminated by simply issuing the commands to turn the cursor off when keyboard input is not being accepted, and on when it is.

When editing a menu, there seems to be no way to get a list of the commands under a particular menu option. If that option is not working, the user has to retype the entire command list. It is not possible to change just part of it. Once the menu is working as desired, though, this is no longer a factor.

The only real problem is that each command line can be only 80 characters or less. This fact is not mentioned in the documentation. Although it's seldom necessary for a command to be longer than 80 characters, it would be nice if it were possible. A link list I needed to type for my C compiler was just too long to fit. I got around the problem by putting the line in a script file and merely calling the file from the command line. This allowed me to do what I wanted, but it was not the ideal solution.

Multi-Menu is very useful and user-friendly. Aside from the minor problems, it is a pleasure to use. It should greatly increase the usefulness of many older programs and aid productivity, as well. I highly recommend it.

(Alpha Software Technologies, 2810 Buffon St., Chalmette, LA 70043, 504-279-1653; $19.95 plus $3 S/H)

See pg 97

— Robert Marsa

Software CoCo 1, 2 & 3

Math Games — The Pluses and Minuses

I'll always remember how boring it was to learn basic math. As children, most of us experienced the frustration of having to learn math by seemingly endless hours of drilling.

While there is no substitute for continuing practice, the contribution of home computers makes the task a lot more fun and challenging. There is a kind of added enjoyment in computer-aided learning. The computer provides the user with a sense of security and confidence in knowing that it won't get angry and scold if the same mistake is made over and over again.

Math Games is a package of four educational programs designed to take the boredom out of math drills and at the same time provide a game-like atmosphere more conducive to a solid learning experience. The fact that each of the four programs is designed as a game helps to motivate the student and hold his or her attention.

The set of four programs enables the student to improve *skills in addition*, subtraction, multiplication and division, using increasing levels of difficulty. They are supplied on disk or cassette and require a minimum of 16K Extended Color BASIC on your CoCo 1, 2 or 3.

I found that two of the four programs use the high-speed poke and would not run on my old CoCo 1 until I edited out the `POKE65495,0` statements. This editing should not present much of a problem to the average CoCo 1 user; but if you don't *know* how to edit in BASIC or don't care to, you won't be able to run *Raceway* or *Pyramid*.

Raceway is a Hi-Res program that pits the student against the computer in solving basic math problems as quickly as possible. Three race cars are shown at the top of the screen, and they move after each answer is given. The quicker you respond, the farther your car moves ahead of the rest of the pack. Incorrect responses cause your car to lag behind, and possibly lose the race.

Raceway times the student's response only after the problem is presented.

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PCDUMP	display PC disk sector	**RSDUMP**	display RSDOS disk sector
PCREAD	read PC file	**RSREAD**	read file from RSDOS disk
PCWRITE	write file to PC disk	**RSWRITE**	write file to RSDOS disk
PCRENAME	rename PC file	**FLEXDIR**	directory of FLEX disk
PCDELETE	delete PC file	**FLEXDUMP**	display FLEX disk sector
PCFORMAT	format PC disk	**FLEXREAD**	read FLEX file
		FLEXWRITE	write file to FLEX disk

Extensive Options Single, double sided disks. 40 or 80 track floppy drives. 8 or 9 sectors. First level sub-directories - PC (MSDOS). FLEX transfers binary files also.

Requires OS-9 (Level 2 for MultiVue), 2 drives (one can be hard), MultiVue for MultiVue version, SDISK (SDISK3 for MultiVue) - see D.P. Johnson ad for SDISK

GSC File Transfer Utilities for CoCo - MultiVue version $54.95

GSC File Transfer Utilities for CoCo - Standard version $44.95

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Pressing the space bar starts the timer, so the student is able to think before beginning each problem. The program uses artifact colors and is best viewed on either a composite color monitor or color TV. If you are using a CoCo 3 with an RGB monitor, you won't be able to see the colors.

Pyramid is also a speed drill that should prove to be challenging to the student. In this program, the timer runs constantly and the object is to answer each problem as quickly as possible before running out of time. Each correct answer results in a colorful block being added to a pyramid under "construction." Three levels of difficulty are provided — the higher the pyramid grows, the shorter the amount of time allotted on the timer.

Pyramid was my favorite of the four programs, and I had to try several times to complete my pyramid. The game also uses the high-speed poke and will have to be modified if your CoCo 1 won't accept this higher speed.

Go to the Top is a multiplication program that requires the student to achieve instant recall of the multiplication tables through the 9s. Each problem is presented in a random nature, and again a timer is used. Enough time is allowed to find the right keys on the keyboard but not to calculate the answer. Incorrect answers are noted and the problem is repeated until a correct response is given.

As each level of the table is successfully mastered, the computer provides the student with an encouraging pat on the back. After all of the problems are solved, the computer responds with a series of colorful bars and sound effects.

Math Word Problems forces the student to apply his or her knowledge of addition, subtraction, multiplication and division in solving word problems. Most students hate word problems, but we all know how necessary they are if the student is to master math facts. *Math Word Problems* will help the student learn which operations are required to solve different kinds of problems.

I found the *Math Games* package to be a very user-friendly series of educational programs. All of the programs are useful to elementary students through about the 6th grade, and would be beneficial to any student who needs further help in learning basic math facts. With the exception of the high-speed poke problem, I like all of the programs and believe that students, parents and teachers will find it helpful.

(E.Z. Friendly Software, Hutton & Orchard Streets, Rhinecliff, NY 12574, 914-876-3935; $19.95 plus $1.50 S/H)

— David Gerald

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Software CoCo 1, 2 & 3

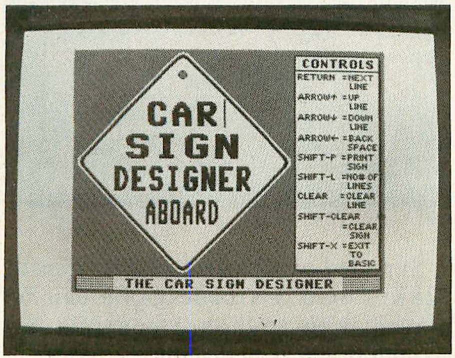
Car Sign Designer — Creative Program on Board

You've seen them . . . those little, yellow, diamond-shaped signs stuck to the back window of passing cars. What began as a novel way of alerting other motorists that babies are on board has turned into not-so-serious and often hilarious message-bashing, with such parting shots as "EX-HUSBAND IN TRUNK." They seem to sprout as fast as dandelions in the spring.

For those of you who enjoy creativity, Zebra Systems' *Car Sign Designer* kit provides everything you need to make your own custom yellow car signs — even yellow printer paper. The program is supplied on a single unprotected disk and works on the CoCo 1, 2 or 3. The handsomely packaged product also includes two reusable plastic sign holders with suction cups. The 21-page instruction manual is easy to follow and well-illustrated.

The first thing you do after making a backup copy is run the configuration program, which allows you to select your type of printer and baud rate. The program supports a full line of DMP and Epson-compatibles. Baud rates from 300 to 9600 are supported.

When you run the program, you see the diamond-shaped sign area and a list of commands on the right. Messages can include alphanumeric characters, as well as standard punctuation characters. Special key presses will call up graphics such as smiley faces and musical notes. Text and graphics are automatically centered, and you can select from one to four lines of text.



An important thing to note about *Car Sign Designer* is that the sign itself is not the result of a screen dump to your printer — the configuration program ensures that a high resolution image is generated. The quality of the printed image is exceptional, and on my Gemini 10X printer the printout approached commercial quality.

(Zebra Systems, Inc., 78-06 Jamaica Ave., Woodhaven, NY 11421, 718-296-2385; $29.95)

— Jerry Semones

Software CoCo 3

Graphics-25 — Animation Station for Your CoCo 3

Graphics-25, a machine language utility that enhances BASIC's graphics capabilities on a 512K CoCo 3, allows you to use the maximum amount of memory available to create and store up to 25 individual graphics screens. Quick display and palette changes are available to facilitate smooth and rapid animation.

According to the documentation, *Graphics-25* provides six new BASIC commands. `WPAGE` specifies the position in memory where your graphics commands will do their work. `DPAGE` instructs the computer which page to display on the screen. `HCOPY` takes the contents of one graphics screen and copies it to another. `HLOAD` and `HSAVE` respectively load and save graphics to disk. `HCLEAR` clears the entire graphics memory.

Actually, most of these commands are improvements on existing Extended BASIC commands to make Hi-Res graphics work easier. For example, `HCLEAR` is a more sophisticated `HCLS` command. `HCLS` clears only one screen at a time, but `HCLEAR` does all of them at once. `HCOPY` is a Hi-Res version of `PCOPY`. Others, like `WPAGE`, combine the characteristics of `HSCREEN`, `HGET` and `HBUFF` to make a more powerful and easy command.

The manual is excellent and goes into more detail than the documentation of the majority of utility programs I've seen. However, it assumes that you have some basic knowledge of CoCo 3 graphics. I suggest that you review parts 3 and 4 of Tandy's Color Computer 3 Extended BASIC manual before using the program. Additional support is also available from the author at Gosub Software.

There are a few guidelines that must be followed in using the program. It will work only with Disk Extended Color BASIC 1.0 or 1.1. It *cannot* be used with J&M DOS, ADOS, OS-9, RAM drives or most other system enhancements except Gimmesoft's *Fkeys III* and *Six-*

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drive. Graphics-25 must be loaded and memory-resident before you load programs that contain these new commands. When saving graphics screens, be aware of the memory limitations on the disk. Each page you `HSAVE` will take up eight granules, allowing a total of eight pages per empty formatted disk.

The four demos included with the program were done in BASIC using *Graphics-25*. They're simple, but good samples of what the program can do. In writing my own routines, I found it helpful to use the listings from the demos as a starting point. The program does not create graphics; the user must do this from BASIC.

Graphics-25 would be best used by someone who has some graphics experience and wants to animate from BASIC. It's reasonably priced and includes excellent documentation.

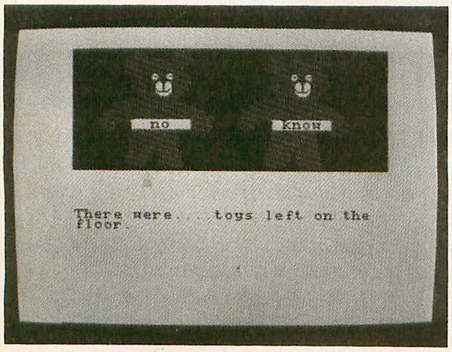
(Gimmesoft, P.O. Box 421, Perry Hall, MD 21128; 800-441-GIME; $24.95 plus $3 S/H)

— Mark Haverstock

Software CoCo 1, 2 & 3

Teddy Bears — Quizzes and Dancing Bears

Teddy Bears is an educational program intended for pre-school children. It features a very simple user interface that allows the child to answer simple questions contained within the program, or supplemental questions you create yourself.



There were ... toys left on the floor.

Two cuddly teddy bears are displayed in color at the top of the screen. The computer asks a question and the child must point an arrow to the teddy who bears (excuse the pun) the correct answer. The arrow can be moved either with the arrow keys, a joystick or mouse if you have one connected. If the student provides the correct answer, the bears dance to a short, lively tune. A wrong answer results in a "no-no" kind of sound and a blinking screen.

While the program loads quickly, it takes about 30 seconds for the bears to be created in the graphics pages in memory. *Teddy Bears* requires a minimum of 64K RAM and Extended Color BASIC, and is available on either disk or tape. Because the program uses artifact colors, it looks best on a composite color monitor or color TV. It works on the CoCo 3, but the colors won't show up on an RGB monitor.

Teddy Bears allows you to create your own quizzes. The questions should be kept short but can be in the form of fill-in-the-blank or true/false, math problem or spelling, and so forth.

By examining the program's self-contained quiz, you will get a good idea on how to construct your own. The quizzes you create may be saved to disk for later use; they can be repeated after all the questions have been answered. The computer keeps track of the answers and displays the number missed.

Teddy Bears is a fine teaching program that will delight most youngsters. The graphics are clean, clear and colorful. The musical interludes and sound effects are appropriately placed and instill a sense of accomplishment in the student as the learning process unfolds.

(E.Z. Friendly Software, Hutton & Orchard Streets, Rhinecliff, NY 12574, 914-876-3935; $19.95 plus $1.50 S/H)

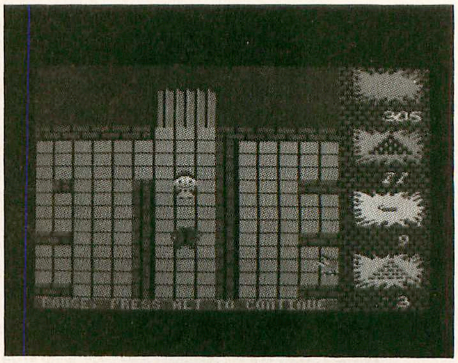
— Robert Gray

Software CoCo 3

A Mazing World of Malcolm Mortar — Mayhem in a Mansion Gone Mad

In *A Mazing World of Malcolm Mortar*, you play the part of B. Rick, an apprentice bricklayer working on the renovation of a huge mansion full of many, many rooms and hallways.

One day as you work and slave under the weight of numerous loads of bricks, the mansion magically transforms into a sinister maze. You are confronted with many fuzzy creatures (armed with poisoned quills) that can jump out at you at any time. The bearded foreman — Malcolm Mortar — is hostile to you. Your goal is to find a way out of the endless mazes in search of his evil lair, where he can be trapped.



Supplied on a cartridge, this colorful 128K CoCo 3 arcade game can be played with keyboard controls, although it works best with a joystick.

The game consists of many screens and levels of difficulty. You have several tools to assist you in your efforts of trying to trap Malcolm Mortar: ordinary bricks, magic bricks and dynamite. As you "wall in" the many fuzzies, your work is made harder by a "Borehead" who just loves to bore holes in your newly bricked walls to let those little rascals back out.

Points are awarded for the number of mazes you master, the number of bricks you lay and sticks of dynamite you use. To win the game you must trap Malcolm in his lair by building an enclosure of magic bricks around him.

The game screen is divided into two portions — the maze display and a scoreboard. The scoreboard lists your current score, brick count, dynamite count, and the number of magic bricks you have. Sound can be toggled on and off by pressing the S key. You can press ALT to pause the game.

A Mazing World of Malcolm Mortar is a fun game that's right for all ages. The action is fast and furious, the graphics are excellent and the price is reasonable. It's nice to see a game with a new theme for a change.

(Tandy Corporation, 1700 One Tandy Center, Fort Worth, TX 76102; $29.95: Available in Radio Shack stores nationwide.)

— Robert Gray

Software CoCo 1 & 2

Labyrinth — Lost in a Dungeon Maze

The definition of *labyrinth* in the dictionary is "a place constructed of or full of intricate passageways and blind alleys." That is truly the description of this graphics Adventure, which is full of tunnels and rooms. The top half of the screen provides a graphic display of the surroundings, and the bottom half gives text descriptions.

Labyrinth is written for a 64K CoCo 1 or 2 with Extended Disk BASIC, but it will not work on CoCos earlier than an F board. The program comes on an unprotected disk, so you can make backup copies. I found the people at RTB Software to be very helpful with my problems — they even supplied me with some hints.

Your character in *Labyrinth* is King William, the ruler of the kingdom of Templeton. But an evil wizard by the name of Zarth cast a spell that made you a prisoner in his labyrinth, and then took over your kingdom. Your mission is to return to Templeton, destroy the evil wizard and reclaim your throne.

This puzzle is not something the average Adventurer is going to solve in one night. In fact, it took me two hours and finally a call to the author to get out of the first room. The loading instructions are adequate, but the documentation should include a list of the verbs used to get a beginning Adventurer started.

Labyrinth is played on two levels, and secret passwords are required. You can carry as many objects as you want, so there is no need for a `DROP` command. There is also no game save feature, which is another slight flaw — but should you die in Level 2, you will start again at Level 2.

Also, *Labyrinth* never plays the same way twice. In one game you may be able to successfully get through a certain room, but in another game you may fall through the floor in that same room. There is no warning as to when this type of thing will happen (be wary or you may get torn to shreds by Jerrad the Creature).

You must periodically look at the objects in your inventory, as well, to ge clues. The command `USE INV` will call up an inventory listing. The "review situation" command, `LOOK`, is useful if you clear a screen of text and have to remember the exit directions or go back where you came from and try again.

I found *Labyrinth* very exciting and fun for the whole family. With the exception of a few flaws (a game save feature would be a nice addition), I think it is well worth its price.

(RTB Software, P.O. Box 777, W. Acton, MA 01720, 508-263-0563; $24.95 plus $3 S/H)

— Robin Thon

Accessory CoCo 1, 2 & 3

MPI-CoCo Locking Plate — Keeping Connections Solid

We have all heard the expression about building a better mousetrap and

SUNDOG SYSTEMS

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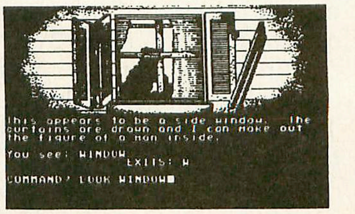
A new animated graphic adventure for the Color Computer 3 from the author of the Hall of the King trilogy! Enjoy the mixture of science and fantasy as you quest for the Phoenix Crossbow, the only thing that can save you in the post-holocaust world. A full 4 disk sides of adventure! Outstanding 320x200 graphics will make this your favorite CoCo adventure! Req. 128K CoCo 3 and disk drive. Only $34.95.

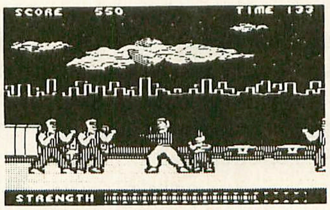

This appears to be a side window. The curtains are drawn and I can make out the figure of a man inside.
You see: WINDOW
EXITS: W
COMMAND? LOOK WINDOW

Kung-Fu Dude

An exciting new arcade game. This is the long-awaited response to the huge demand for a Kung-Fu program for the CoCo. The graphics, sound effects, and animation are spectacular! This is the BEST karate game ever available for the Color Computer. Req. 64K, disk drive, and joystick. Only $24.95.

"The CoCo karate gap has been filled and Kung-Fu Dude does it excellently. I highly recommend (it)!" -2/88 Rainbow review

"A definite 5 stars!" -12/87 Wizard's Castle review



WHITE FIRE OF ETERNITY

64K Animated Graphic Adventure. See 12/86 Rainbow review. Only $19.95.

CHAMPION

64K Superhero Action Adventure. See 5/87 Rainbow review. Only $19.95.

All programs CoCo 1, 2, 3 compatible unless stated otherwise.

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d beating a path to your door. mmesoft has built a better usetrap in the form of a handy gadget that prevents accidental shorting of the Multi-Pak pins to the cartridge port pins on the side of the CoCo 3. And if I'm not mistaken, *they* are soon about to have the world beating down their door.

Many of us have suffered the unpleasant experience of having to take our burnt-out CoCos to the repair shop after accidentally bumping the Multi-Pak Interface. Gimmesoft has designed a rather simple, yet effective, way to prevent such accidents from ever happening again.

The solution is in the form of an L-shaped, 10½-by-6 inch piece of 3/16-inch thick plastic with four holes that match rubber feet locations on the MPI and CoCo 3. Two long screws come with the package and are driven through two smaller holes in the locking plate to secure it in place. The locking plate is simple to install and very effective. I tried several deliberate bumps, hits and slides, but was unable to unseat the MPI from my CoCo 3.

Two versions of the locking plate are available, one for use with the older style MPI (26-3024) and another for the newer (26-3124).

This is one of those gadgets you will be tempted to build yourself. But don't be too hasty. Gimmesoft has saved you a lot of trouble in finding material of just the right thickness, and even in a color that is a fair match to the CoCo 3 and MPI. In my opinion, the locking plate is well worth its $9.95 price tag. For the cost, you'd have a hard time constructing one for yourself that has the quality and finished appearance Gimmesoft has provided. (Even the mounting holes are counter-sunk.)

(Gimmesoft, P.O. Box 421, Perry Hall, MD 21128, 301-256-7558; $9.95)

— Jerry Semones

Hint . . .

At Your Command

Three main directories are found on the OS-9 System disk. The "root" directory is at the top, and you can look in it by using the directory (`dir`) command: Type `dir /d0` at the OS-9 prompt. If you do this you will see the other two directories mentioned:

```
Directory of /d0 12:33:08
OS9Boot      CMDS         SYS          startup
window.t38s window.t80s window.glr4
```

Because you are in the root directory you can see the names of `/d0` (disk zero) titles in the listing on the screen. You can also see five "files" in lowercase letters and the other two directories in uppercase letters. You can take a peek at the `SYS` (system directory) using the directory command if you want, but it is the `CMDS` (commands) directory that interests us at the moment. Typing `dir /d0/cmds` will produce something like this:

```
Directory of cmds 12:38:12
attr        backup      build       cmp
cobbler     copy        date        dcheck
deiniz      del         deldir      dir
display     dsave       echo        edit
error       format      free        grfdrv
help        ident       iniz        link
list        load        makdir      mdir
merge       mfree       modpatch    montype
os9gen      procs       pwd         pxd
rename      setime      shell       tmode
tuneport    wcreate     unlink      xmode
```

Each item stored in the `CMDS` directory should respond with an action if you type the command at the OS-9 prompt. The `list` command is a useful one to try out. It lets you peek into any unprotected file to see its contents. At the OS-9 prompt, type `list startup`, and you'll get a peek into that file. Try files like `window.t38s` or `sys/logbook`, and you'll see how useful the command can be. It won't, however, let you see what is in files like `OS9Boot` or the command files themselves, because they are protected by the authors.

Another useful command is `copy`. Typing `OS9:copy window.t38s /d0/cmds/window.t38s` would put an exact copy of the `window.t38s` file into the `cmds` directory. Notice the space after `copy` and the space after the filename. Translated into English, this OS-9 command line says that the operating system (`OS9`) is instructed to copy a file (`window.t38s`) in the root directory following a path (`/d0/cmds/window.t38s`) to the `CMDS` directory.

Having done it, you had better undo things by deleting the file, which doesn't belong in the commands directory: `OS9:del /d0/cmds/window.t38s`.

The `backup` command copies everything on one disk to another disk; if you want to copy just one file from one disk to another, use the `copy` command. For instance, you might want to put a copy of a new OS-9 word processor onto a disk where you have your OS-9 database. On a single-disk system, you would type `OS9:copy /d0/cmds/newword /d0/cmds/newword -s #40k`. This means to copy from the `CMDS` directory of one disk to the `CMDS` directory of another disk using Drive 0 (`/d0`) in each case. The `-s` tells OS-9 you are using a single drive, and the `#40k` sets aside memory so that you won't have to swap disks as often.

It turns out that many of the commands found in the commands directory are also in memory all the time, but that is another story for another time. There are nearly 50 different commands to try, and you are unlikely to do any harm trying them. Risk a little and see what you have at your command.

Del Turner
Kamloops, British Columbia

Received and Certified

The following products have recently been received by THE RAINBOW, examined by our magazine staff and issued the Rainbow Seal of Certification, *your assurance that we have seen the product and have ascertained that it is what it purports to be.*

Adventure in Lumeria, the third chapter of the *Labyrinth/Quest for the Ring* series. In this Adventure, King William, finding himself lonely after defeating Zarth and regaining his throne, decides to rescue the princess of Lumeria, who has been kidnapped by an evil count. For the CoCo 1 and 2 (does not work on CoCo 1s earlier than an F board). *RTB Software, P.O. Box 777, W. Acton, MA 01720, (508) 263-0563; $36.95.*

AR-16 Serial Output Interface, a board that provides 16 output channels, allowing software control of 16 different devices. Additional channels can be added with expansion cards. Connects directly to the serial port of the CoCo 1, 2 or 3. Requires cables, relays and supply. *Electronic Energy Control, Inc., 380 S. Fifth St., Suite 604, Columbus, OH 43215, (614) 464-4470; $89.95 plus $3 S/H.*

Castle of Tharoggad, a totally icon- and menu-driven Adventure of the D&D genre. Your character's mission is to storm the treacherous castle to rescue the good wizard, slaying beasts and evading traps set by the evil wizard. *Tandy Corporation, 1700 One Tandy Center, Fort Worth, TX 76102; $29.95. Available in Radio Shack stores nationwide.*

F **Extender Board**, a board that extends bus and control lines for easy access, provides one horizontal and two vertical sockets, a logic analyzer plug-in, and gold connectors. Designed for the educator and experimenter, with possible applications in robotics and synthesizers. *Fraser Instrument Co., P.O. Box 712, Meridian, ID 83642, (208) 888-5728; $45 plus $3.50 S/H.*

Gantelet II, a sequel to the popular game that turns you loose among monsters, wizards, warriors and potions. Requires a 128K CoCo 3 with one disk drive and optional joystick. *Diecom Products, Inc., 6715 Fifth Line, Milton, Ont., Canada L9T 2X8, (416) 878-8358; $29.95 U.S., $37.95 CDN.*

F **Ironsides & Crimson Sails**, a two-player game for the 512K CoCo 3 running OS-9 Level II and utilizing 640-by-192 graphics. The game comes on a single disk that contains five separate naval scenarios, which range from fictional settings to actual simulations of historical naval engagements. There is a game save/load feature. *softWAR Technologies, The Ameritrust Building, 17140 Lorain Ave., Cleveland, OH 44111, (216) 251-8085; $8.95.*

KDSK3, a machine language, menu-driven collection of disk utilities written for the CoCo 3. It is an upgrade of *KDSK* V2.6, written to take advantage of the CoCo 3's 80-column display and additional memory. Options include an ASCII dump, sector editing and a fast copy routine. Requires CoCo 3, Disk Extended Color BASIC and at least one disk drive. An RGB monitor is recommended. *Kenneth L. Wuelzer, 113 Arrowhead Drive, Montgomery, AL 36117, (205) 277-9880; $15.*

my

Keyboard Commander, a "space age" typing tutor that utilizes the action of an arcade game to teach confidence in students learning to touch type. Numbers, upper- and lowercase letters are covered while defending your ships against alien attack. Requires 64K ECB. *E.Z. Friendly Software, Hutton & Orchard streets, Rhinecliff, NY 12574, (914) 876-3935; $24.95 plus $1.50 S/H.*

Legend Quest, an Adventure in which, as Professor Ludwig, the first expert in the field of legend science, you set out to find the gold at the end of the rainbow. Unfortunately, your prospective rainbow shatters and falls into an enchanted land. (Of course you must follow.) Requires a 64K, disk-based CoCo with at least one joystick. *Nick Bradbury, 10500 Sandpiper Lane, Knoxville, TN 37922, (615) 966-0172; $15.*

F **Lyra Lybrary**, an 11-disk collection of music (all *Lyra* transcriptions) to be played in conjunction with MIDI synthesizers. The music can be edited with *Lyra* or just played by using the included "jukebox" type program. Requires a 64K CoCo, a Disk BASIC drive, a joystick or mouse, at least one MIDI synthesizer, a MIDI connector and `LYRA.BIN` or `LYRABOX.BIN`. *Rulaford Research, P.O. Box 143, Imperial Beach, CA 92032, (616) 690-3648; $14.95 per disk.*

F **PIA Board**, a board that provides an additional 6821 PIA chip to the CoCo. It has a gold edge connector and four control lines. Designed for experimenters and educators, it can be used alone or with Fraser's Extender board. *Fraser Instrument Co., P.O. Box 712, Meridian, ID 83642, (208) 888-5728; $45 plus $3.50 S/H.*

RI-8 Relay Card, an eight-relay card that connects to the AR-16 Serial Output Interface to allow direct control of connected appliances. Possible applications include energy management, robotics, equipment automation, etc. Requires AR-16 Serial Output Interface. *Electronic Energy Control, Inc., 380 S. Fifth St., Suite 604, Columbus, OH 43215, (614) 464-4470; $76.95 plus $3 S/H.*

F **Shadow World**, a text Adventure in which you have discovered a formula for time travel and have tested your discovery by sending laboratory animals on a trip through time — only to have them burst into flames. You decide you must find out what's wrong with the experiment, even at the risk of your own life. Requires 64K ECB; for the CoCo 1, 2 and 3. *Prodek Software, c/o Mike Snyder, Route 2, Box 81, Allen, OK 74825, (405) 857-2852; $10.50 for tape, $12.50 for disk.*

F **SpellBound**, a D&D type Adventure in which, as the brave leader, you select a band of Adventurers to defend the village of Midgard against the forces of darkness in the Archwizard's lair. Possible recruits include elves, dwarves, fighters, thieves, priests and wizards. Requires a 32K CoCo and disk drive. *Thor Software, Suite 162, 9431 Westport Road, Louisville, KY 40241, (502) 588-5969; $20.*

F **StarScan**, a program to allow CoCoists to use the new Star NX1000 Rainbow color printer to print full-color dumps of `HSCREEN2` graphics. The program is 100 percent machine language and can perform a full-color dump in about 5 minutes (from parallel printer port). For the CoCo 3. *J.D. Walker, 363 Oakwood Ave., Jackson, MI 49203, (517) 787-2667; $11.95 plus $3 S/H.*

Ultra-Base, a database programmed in a combination of BASIC and machine language to keep track of more than 500 records, with up to 32K information in memory, at one time. It offers the ability to alphabetize by first or last word in any category. Requires 64K, and is available on tape or disk. *Tothian Software, Inc., Box 663, Rimersburg, PA 16248; $24.95.*

↙ See pg 9 for 3.2 Version

Word Power 3.1, a CoCo 3 word processor that comes with a spelling checker and mail merge capability. Other features include a listing of available memory for text storage, autosaving, punctuation checker, window display, block moves, search and replace, word count and wild card searches. *Microcom Software, P.O. Box 214, Fairport, NY 14450, (716) 223-1477; $79.95.*

F **First product received from this company**

The *Seal of Certification* program is open to all manufacturers of products for the Tandy Color Computer, regardless of whether they advertise in THE RAINBOW.

By awarding a *Seal*, the magazine certifies the product does *exist* — that we have examined it and have a sample copy — but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to THE RAINBOW reviewers for evaluation.

— Lauren Willoughby

Cross-referencing for information

Locating the Topic

By Steve Blyn
Rainbow Contributing Editor

Learning to use cross-references in a reference book is the topic of this month's article. This is a language arts skill that is applicable to social studies, science and any other subject where information needs to be found in reference books. The skill should be taught in the middle grades of elementary school, and practiced throughout one's life.

"This set of encyclopedias doesn't have that information.That topic isn't here at all." These familiar statements are made by new users of reference books. Children often look under only one heading for information needed and give up if it is not there. If information is not in one location, it may be found in the same reference set under a different, but related, heading. Students must be taught to find and use cross-references for their information.

One teacher may require that a student find information on, say, disk drives. It is quite possible that Volume D of the encyclopedia does not list anything under that topic. The next step would be to look for larger topic areas that might include disk drives. Volume C, under Computers, would be a good place to look. Another choice might be Volume T for Technology.

The idea is to teach children to be detectives. They need to keep searching for additional clues (key words) to use in locating the original subject. Approaching this as a puzzle, mystery or game helps to create interest in this concept. Students might be encouraged to make a list of key words on paper or at the blackboard before introducing the computer program.

The program itself is a game wherein the user must match an original subject with a larger, corresponding, topic area. The program will let students practice looking up information needed for reports and essays — any research task, whether for school or pleasure.

The data consists of 10 subjects and 10 larger topic areas. These represent a random selection of 10 subjects about which a student might have to write a report or present a speech. The subjects comprise the data elements of Line 280.

Steve Blyn teaches both exceptional and gifted children, holds two master's degrees and has won awards for the design of programs to aid the handicapped. He owns Computer Island and lives in Staten Island, New York.

Line 290 is comprised of the corresponding 10 larger categories or topics which are likely cross-references to the original 10 subjects.

Since there are only 10 topics and 10 subjects, we not only welcome but encourage you to alter the data as the game is played. This program will soon be memorized by most students if the data is not updated periodically. Once the idea behind the program is grasped, your child or the students in your class can create data for their own versions of the game. Creating the data teaches this concept as well as does playing the game. Lines 20-70 dimension and read in the DATA statements.

Line 100 chooses among the 20 data options and prints 20 topics, subjects or both. These original elements are not presented in a random order. Rather, they are presented in a manner that contains some duplication and several matches. This gives the game an element of variety.

This game is more enjoyable when a scorecard is included. We use a two-part scoring system. The player is required to answer two questions during each round. Lines 120-140 ask the player to select one of the subjects. Encourage students to read the entire list to make certain there is a correct pair to match before they answer the first part of the question. Five points will be scored for a correct response at this point. Lines 150-200 ask the user to match the subject with the correct topic. Five points is given for a correct answer here. The variable SC is the scorekeeper. The score is given after 10 rounds.

We hope you and your children enjoy using and modifying *The Cross-Reference Game*. Your comments are always appreciated by the staff of Computer Island. ☐

The listing: REFERNCE

```
10 REM"CROSS REFERENCES GAME"
20 REM"STEVE BLYN,COMPUTER ISLAN
D,STATEN ISLAND,NY,1988"
30 DIM A$(10),B$(10),C$(20)
40 FOR S=1 TO 10:READ A$(S):NEXT
 S
50 FOR T=1 TO 10:READ B$(T):NEXT
 T
60 RESTORE
70 FOR T= 1 TO 20:READ C$(T):NEX
T T
80 CLS:Z=Z+1:IF Z>10 THEN 240
90 PRINT@0,"#";Z;"MATCH ONE SUBJ
ECT AND TOPIC";
100 FOR T=1 TO 20:A=RND(20):PRIN
T@32+B,C$(A):B=B+16:NEXT T:B=0
110 PRINT"----------------------
----------";
120 PRINT"CHOOSE A SUBJECT ";:LI
NEINPUT AA$
130 FOR T=1 TO 10:IF AA$=A$(T) T
HEN 150 ELSE NEXT T
```

```
140 SOUND 10,3:PRINT"THAT'S NOT
ANY OF OUR SUBJECTS.":GOTO 210
150 SOUND 200,2:PRINT"GOOD-NOW M
ATCH THE LARGER TOPIC.";:SC=SC+5
160 LINEINPUT BB$
170 PRINT@464,"";
180 IF BB$=B$(T) THEN PLAY"L100C
DEGGG":PRINT"CORRECT"ELSE 200
190 SC=SC+5:GOTO 210
200 PRINT"*";B$(T):PLAY"L2F"
210 PRINT@484,"PRESS ENTER TO GO
ON";
220 EN$=INKEY$
230 IF EN$=CHR$(13) THEN 80 ELSE
220
240 CLS:PRINT@97,"YOUR SCORE WAS
";SC;"THIS TIME"
250 PRINT@192,"PRESS A TO GO AGA
IN OR E TO END";
260 EN$=INKEY$
270 IF EN$="A" THEN RUN ELSE IF
EN$="E" THEN END ELSE 260
280 DATA FILM,ALGAE,HAWAII,BRONT
OSAURUS,WHALES,CLOUDS,MARS,HALLO
WEEN,AUTOMOBILES,COLLIES
290 DATA MOTION PICTURES,PLANTS,
ISLANDS,PREHISTORIC,MAMMALS,WEAT
HER,PLANETS,HOLIDAYS,TRANSPORTAT
ION,DOGS
```

One-Liner Contest Winner . . .

Create a four-by-four "magic square" having a sum equal to the number you input (between 34 and 366).

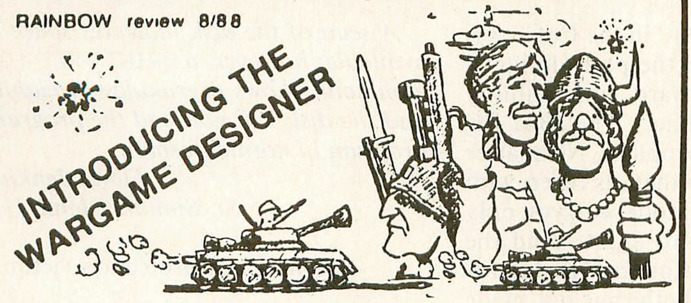
The listing:

```
0 CLS:INPUT"# (34-366)";S:IFS<34
ORS>366THEN0ELSEV=(S+30)/4:H=INT
(V):T=V-H:FORI=1TO16:READR:V=INT
(R/4):PRINT@3*R+20*V+64,USING"##
#";H-(T>0);:T=T-.0625:H=H-1:NEXT
:PRINT@224:DATA9,15,2,4,7,1,12,1
0,0,6,11,13,14,8,5,3:' (C) 1988
 MICHAEL G. TOEPKE
```

Michael Toepke
Oak Harbor, WA

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book of Simulations* and its companion *The Rainbow Simulations Tape*.)

RAINBOW review 8/88



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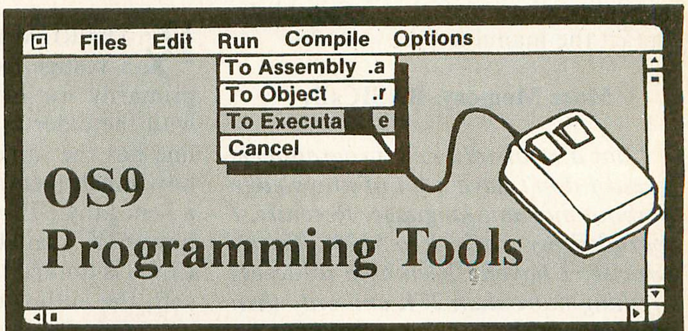

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DOCTOR Q&A ASCII

By Richard E. Esposito
Rainbow Contributing Editor
with Richard W. Libra

Garbled Sound

I have a Color Computer 1 with 64K and an 'F' board. I recently upgraded from a TV set to a Magnavox CM-80 and am using the Mark Data Universal Video Driver. When I run programs that use a joystick, I get constant garbled sound with the sounds of the program on top of it. This happens on programs such as Polaris, Galactic Attack *and* Gopher It, *but does not happen in programs such as* Bats and Bugs *or* Whirlybird Run. *Can this be fixed, or is it a side effect of adding things such as a video driver onto the computer?*

Corby Goodman
Lexington, KY

℞ The only way to diagnose this kind of problem is to remove the suspect part from the machine and see if that solves the problem. If the problem disappears but returns upon reinstallation, recheck the instructions for proper installation; if it's still a problem, contact the manufacturer.

More Memory, BASICally

I am a relatively new programmer, and I don't have a lot of knowledge about machine language. Recently, I upgraded my CoCo 3 to 512K. To my surprise, I haven't been able to access anything more than 27K and only then using the `PCLEAR1` *command. I'm no better off than when I started. Is the only way to access this memory through machine language? I know that many programs do,* CoCo Max III *for one. When I upgraded, I envisioned writing large programs in BASIC with huge string storage areas. Am I out of luck, or is there a fix?*

Andrew Wiest
Anderson, SC

℞ The ROM BASIC in the CoCo 3 is a vestige from the past, designed primarily for backward compatibility with the older machines. The IBM PC line has the same problem. No matter how much memory there is (even with a 3-megabyte PS/2 Model 80), you only have 61K available to BASIC. And the CoCo is limited to around 30K. Microsoft, the author of both, has not made a commitment to upgrade its interpreters to use the extra RAM.

Colorizing the Oldies

Several years ago I purchased a couple of programs that I used for relaxation, enjoyment and relief from the pressure of my work. These worked very well on the CoCo 1 and accomplished precisely what I wanted to get done with them. The programs are 8Ball, *by C.M. Cook and C.J. Roslund, and* Solitaire, *which appeared in RAINBOW Magazine. Now that I have bought the CoCo 3, I still would like to use these fine programs; but I get black-and-white programs instead of color. Since I'm not a programmer, is there an easy way in which I can adapt them to the CoCo 3 so that the colors come out suitable enough to make the programs again most enjoyable? They work fine but are pale imitations of the real thing.*

M.L. Brown
Bellevue, OH

℞ Since the Tandy CM-8 monitor does not support artifacting, if you change the `PMODE4` statements in the programs to `PMODE3`, you will restore the color, albeit at the expense of some detail. The Magnavox 8CM-515 monitor does not share this problem, for it can be operated in composite video mode for artifacting older games.

No Can Do!

The VIP Library *runs fine (with one or two minor quirks) on my CoCo 3/RGB combination. I would like, however, to be able to load it with a* `RUN *` *using the following program:*

```
*/BAS
10 PALETTE9,63:PALETTE13,63
20 LOADM"DESKTOP
```

A scan of the disk indicates space is available; however, a `PRINT FREE (0)` *command shows 0 granules available, and the disk will not load the program program in normal fashion.*

Elbert Jenkins
St. Simons Island, GA

Another copy protection victim.

Weary Plugs and Disappearing Letters

I've recently bought a Deluxe Color Mouse, and I think that plugging and unplugging the mouse and joystick may harm the ports and the jacks. Is there a way to have both joysticks and the mouse connected at the same time? Also, I have Telewriter-64 *and am not able to save my files on disk. Is there a way to do it? If I press the same key more than once, it won't appear on the screen. (For example, the word "appear" shows up as "apear.") Do you know how I can solve this problem?*

Tito Voysest
Lima, Peru

℞ You can always rig up a cable to toggle between the mouse and joystick. Sounds like you have a really old version of *Telewriter-64* that was

---

Richard Esposito is the principal engineer for BDM Corporation. He holds bachelor's, master's and doctorate degrees from Polytechnic Institute of Brooklyn. He has been writing about microcomputers since 1980.

Richard Libra is a simulator test operator for Singer Link Simulation Systems Division.

written for the old gray CoCo 1. Since then, the keyboard scanning routine was moved, causing your problem. Contact Cognitec for an upgrade.

Editor's Note: See Mark Haverstock's "The Old Switcheroo" (August '86, Page 108), a hardware project that gives details for building a switchbox allowing you to connect three devices into the joystick port.

Telewriter's Disk Driving Routine

I have two Teac 55B drives in a Hard Drive Specialist's case and controller. Used with a CoCo 2, these have no problems. I now have a CoCo 3 that works fine until I install the disk drive controller. Commands such as `PALETTE` *and* `WIDTH` *won't work; but more importantly, I can't address the second side of the drives. I put a friend's old Radio Shack EPROM into the spare slot of the controller; now all commands function on the computer, but I've lost Side 2 of the drives. I purchased ADOS-3, which when loaded into BASIC gives me access to both sides of the drives. The problem is that when I run* Telewriter-64 *with* TW-80, *I only have access to drives 0 and 1. The ADOS-3 doesn't seem to have an effect when I load it into BASIC and use* Telewriter. *Will ADOS-3 burned into an EPROM make four drives usable with* TW-80? *Is there an EPROM available that will access two DSDD drives as drives 0 and 1 instead of drives 0, 2, 1 and 3?*

Grant Masini
Granger, WA

℞ ADOS-3 works just fine. *Telewriter* has its own disk driving routine that overrides the routine in ROM.

Bootable Backup

I have a CoCo 3 running DeskMate 3. I can't make a bootable backup of the masters but can only piece together a somewhat workable version. I have Radio Shack's old drives and controller. I have not had much luck with any backups except `/d1` *to* `/d0`.

Ted Crafton
Miami, FL

℞ All OS-9 software distributed by Radio Shack is on 35-track single-sided 5¼-inch disks and can be backed up easily using Disk Color BASIC's `BACKUP` command.

Fixing DeskMate 3

I have a CoCo 3 and DeskMate 3 *with a DCM-3 connected to the serial port. I can't get communication through the serial port. Is there a fix for* DeskMate 3?

Mike Becker
Woodstock CT

℞ OS-9 Level II only supports two-way serial communication via a Modem Pak or RS-232 Pak, so you cannot use *DeskMate 3* for communications over the `/T1` serial port.

A Patch for OS-9

How can I change the sequence of bytes on VIP software? VIP Disk-Zap *doesn't work with OS-9. Is there an OS-9* Disk-Zap *program?*

Serge Alepins
Lemoyne, Quebec

℞ There is an excellent on-disk OS-9 program patcher, called *Patch*, marketed by Computerware. Also, since the format for OS-9 and Disk BASIC is the same (the actual physical disk format), you can use VIP *Disk-Zap* to *edit* OS-9 disks. You just can't zap them.

A Vote for the Hard Drive

I am planning to purchase a vertical-slot, dual double-sided disk drive, compatible to OS-9 Level II, in a slimline case for my CoCo 3. Do you know who sells one? If you were buying one for yourself, which would you put at the top of the list? Is it true that someone in the United States is developing a 1-megabyte RAM board for the CoCo 3?

Ryan Plammer
Vancouver, British Columbia

℞ I would get one floppy and one hard disk and put them both in one case. CoCo hard drives are much faster and cheaper than the floppies were a few years back, hold much more data, and should no longer be ignored.

Updating Disk Controllers

Quite a few letters have been published in THE RAINBOW from people who have old-style disk controllers requiring 12 volts. They wish to use them with CoCo 2s or 3s but can't because the CoCo 2 and 3 don't have 12 volts available. The usual suggestion is to bring 12 volts out to the plug from inside the computer. It is also possible to add a 5- to 12-volt converter, available from Marlin P. Jones, Lake Park, FL, (305) 848-8236. It's Part Number PS-1934 and costs $2.50. I've done this with two controllers and find that it also requires a 12-volt zener diode.

Another way is to replace the disk controller chip, WD-1793, with an MB-8877, available from Jameco Electronics with a $20 minumum order or from JDR Electronics, (800) 538-5000. I buy them locally from Arkline Electronics in Toledo, (419) 476-6727. I've done three this way, and they work just fine.

Your February column states that some CoCo 2 programs such as VIP *have a problem easily fixed with the GIME chip in the CoCo 3.* So how do you fix it already? *This is the only thing stopping me from going to a CoCo 3.*

Robert W. Klahn
Sylvania, OH

℞ The easiest way is to use a disk-zapper program. Assuming you don't have one, the next best way is to write a BASIC program that reads the offending file as a random access file with records of one character each. When your program reads the code that needs changing, write out the corrected bytes. Be sure to do this on a backup of the original.

Printing While Online

I am presently using Greg-E-Term *with my CoCo 3. I heard that there is a way to have my printer print while I am on-line. I'm using a DMP-130 printer with a DCM-3 Modem. Do you know of any way to print while in Communications mode? Also, have you heard of people using a DCM-3 and being unable to use* MikeyTerm *as a result?*

℞ It is possible to construct an RS-232 Y-cable so that your printer can be online; however, the printer must be able to run at the same speed as your modem without overflowing its RAM buffer.

For a quicker response, your questions may also be submitted through RAINBOW's CoCo SIG on Delphi. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type `ASK` for "Ask the Experts" to arrive at the EXPERTS> prompt, where you can select the "Doctor ASCII" online form which has complete instructions.

An update on the parallel interface and a hardware patch for the Multi-Pak

Summer Cleanup

By Tony DiStefano
Rainbow Contributing Editor

This month we will look at two short items. The first is an update on an earlier project, and the other is a hardware patch for the Multi-Pak's IRQ problem.

In a two-part project in November and December of 1987, I described making a parallel interface and building it right into the CoCo. It turns out that some people are having problems. Paul Anderson of SD Enterprises said that the DWP 430 printer from Radio Shack requires a longer strobe pulse width than my circuit delivered. At 2 MHz (the double speed for the CoCo 3), the problem was even greater.

I have an Epson FX-80 printer. When I tested my circuit on it, it worked fine. The pulse width for the strobe signal (even at 2 MHz) is wide enough to make it work. If you look back to the circuit in the November '87 RAINBOW, you see that the signal connecting the data into the latch is also the signal that drives the strobe signal of the printer. That signal is derived from the memory mapping of data from the CPU. This makes the width of the signal directly proportional to the clock speed of the CPU. The faster the CPU is clocked, the shorter the strobe pulse is. For my printer this is no problem, but for slower strobe printers like the DMP 430, it is a problem that must be addressed.

To solve this problem, I looked at the spec sheets of several popular printers. Much to my surprise, I found out that printers have a wide range of strobe pulse widths, from .5 microseconds to a full 2 microseconds. Not only that, I also found out some printers require that data be valid up to 1 microsecond before the strobe line goes active. If you look again at my circuit, the strobe line is active at the same time as the data. *Oops*! I guess I should have done my homework before putting out that article. Well, fortunately, I have a good fix. After looking through my TTL data books, I came up with a circuit that will give the strobe signal both a 1-microsecond delay and a pulse width of 2 microseconds. That should be enough to satisfy any printer's needs.

The chip I decided to use is a 74HC123, which is a *dual retriggerable monostable multivibrator* — a mouthful, but not that complicated. Basically, there is an input signal and an output signal. An R/C (resistor/capacitor) constant determines how long the pulse is. Every time the input is strobed, the output becomes active for the duration of the pulse width, which is controlled by the R/C constant. I chained the output of the first multivibrator to the input of the second, which then goes to the strobe of the printer. The first gives me the delay to set up the data; the second gives me a pulse width that is controllable by the R/C constant and not the clock speed of the CPU.

Construction of this, I hope, won't be too hard. If you have already built the parallel printer adapter and have enough room to fit one more chip and four components, you're home free. If you have not built it yet but want to, just make sure that you have enough room to place one more chip. The rest of it is the same as in the November '87 issue.

If you don't have enough room, you have two choices: Start over again, or make a small piggypack board. I suggest that you start over, since it makes for a cleaner job and is easier to trace if you have a problem.

The circuit in Figure 1 is the fix only and does not include the rest of the circuit needed to make the complete parallel adapter. The 74HC123 chip requires +5 volts on Pin 16 and ground on Pin 8. To interface it into the rest of the original circuit, follow these instructions:

1) Remove the wire that goes to Pin 1 of the printer connector.

2) Connect that wire to the point marked "input" in Figure 1.

3) Connect the wire marked "output" in Figure 1 to Pin 1 of the printer connector left vacant by Step 1.

4) Connect +5V and ground to the chip.

With this modification, no other changes are required; the software remains the same, and all printers should work at either slow or fast speed.

The second part of this article deals with interrupts and the Multi-Pak. Many people may never come acoss this problem, which will show up only in certain cases. First, I think that explaining what the Multi-Pak does will help you understand the problem.

The Radio Shack Multi-Pak has four slots and was Radio Shack's original idea to expand the CoCo; the idea was that people who bought the expander would plug four game packs into it. As we all know, Radio Shack game packs auto start. That means when you plug in a pack (without a Multi-Pak) and turn the computer on, the game (or whatever) starts to play all by itself. To do that, the computer must be able to sense the presence of the pack. One pin on the connector connects to the CPU's interrupt pin via a PIA. On an auto-starting game pack, this pin is connected to the Q clock. The Q clock is a signal coming from the internal circuits that runs at 1 or 2 MHz, depending on the mode of the computer. This signal is fed into the interrupt pin of the CPU. The CPU responds to this interrupt by a small routine in ROM that jumps to the software inside the game pack.

In making the Multi-Pak, Radio Shack wanted to be able to handle four packs instead of one. To choose which one of the packs works requires a switch, so a four-position switch was added. The first part of the switch is a block of memory known as CTS. This block, as long as 16K, is found from `$C000` to `$FEFF` for a CoCo 1 and 2 and from `$C000` to `$FDFF` for the CoCo 3. The second is another block of memory known as the SCS area and is mapped from `$FF40` to `$FF5F` on all CoCos. The third part of the switch reroutes the interrupt signal from the selected slot or game pack to the CPU.

To make the Multi-Pak software

Tony DiStefano is a well-known early specialist in computer hardware projects. He lives in Laval Ouest, Quebec. Tony's username on Delphi is DISTO.

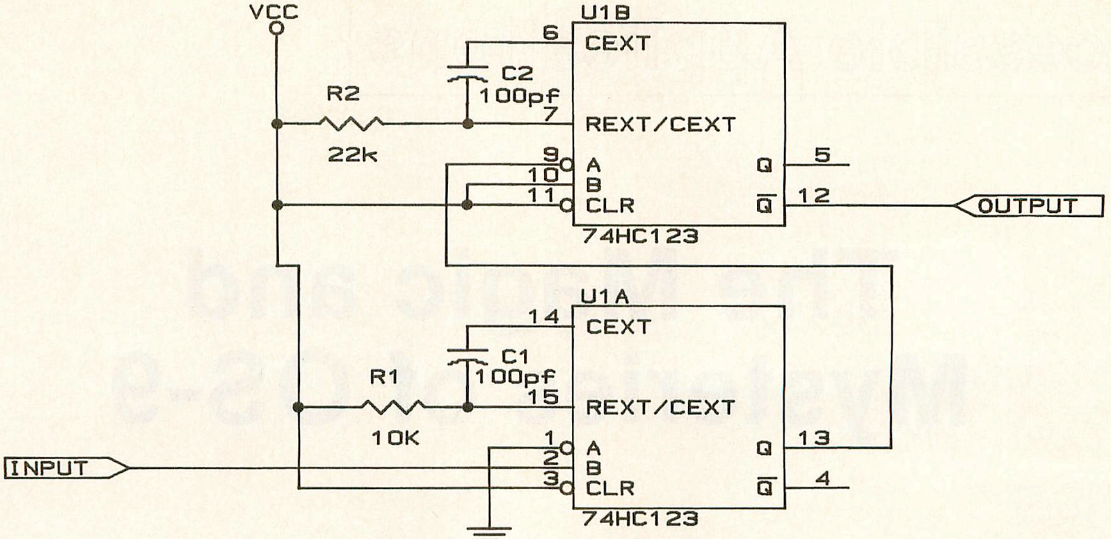

Figure 1

selectable as well, Radio Shack made one memory location, `$FF7F`, into a software switch. The 8-bit location was divided into four 2-bit decoders, two of which control which of the four slots are active. Since the two memory blocks are controlled separately, the CTS block can be selected to one slot and the SCS block to another. This was a good idea, since the CTS block usually contained software and the SCS block usually contained hardware I/O.

At this point Radio Shack decided to tie the interrupt router to the same circuitry that controls the CTS, so that whatever CTS slot is active originates the interrupts. This arrangement is OK for game packs, since changing the switch to another slot means that whichever slot has the interrupts also has the right software. Good for game packs, but not so good for OS-9 users — OS-9 relies heavily on interrupts. Most hardware handshaking is done with interrupts. OS-9 uses the all-RAM mode, so the CTS signal is not used. But with the Multi-Pak, the software switch still switches the interrupt signal. The problem is mostly seen when someone uses the Deluxe RS-232 Pak.

Under OS-9, drivers and hardware devices can be added and left out to suit the owner's particular needs, but no one driver knows what else is using the hardware. When one device driver needs the interrupt line, it changes the software switch to the slot the hardware is in. If another driver needs the interrupts, it switches it back; this is where the problem starts. When you change the software switch away from one slot, the interrupt has a chance of getting lost. The problem gets worse when a device like the RS-232 Pak is online. The registers for this pack are memory-mapped in an area not covered by the software switch, while the interrupts are covered by the software switch. So if one driver switches the software switch away from the slot the RS-232 pack is in, it can no longer produce an interrupt. Even though the registers are still in the memory map, data is lost and things start to get confused.

One solution for this is a small modification in the Multi-Pak. Interrupt signals in non-game packs are usually "open collector," meaning that more than one signal can be connected together to form an "OR" type of configuration. A simple way to avoid the problems is to connect all the interrupts together, so that no matter which slot the interrupt comes from, the signal comes through. This mod is simple and quick. A little soldering experience, a few tools and a short piece of wire are all you need. Unplug the Multi-Pak and remove the bottom screws. Remove the top and disconnect the power to the board. Now, remove the screws that hold down the PC board. Carefully remove all the pins that hold the bottom shield to the board. Locate Pin 8 on each of the four slot connectors. Solder a piece of wire from one to the other until all slots are done. Reassemble the Multi-Pak in reverse order, and that's all there is to it.

With this modification you should be able to use the RS-232 Pak under OS-9 with any one device that changes the software slot switch and without losing characters on the Pak.

One-Liner Contest Winner . . .

This one-liner is for killing files one at a time, without having to type the `KILL` command and drive number for each and every file.

The listing:

```
1 CLS:PRINT:PRINT:INPUT"ENTER DR
IVE";A:DRIVEA:DIR:INPUT"FILE TO
KILL";B$:KILLB$:PRINT"KILL ANOTH
ER?(Y OR N)":INPUTC$:IFC$="Y"GOT
O1ELSEDRIVE0
```

Brian Carter
Santa Ana, CA

(For this winning one-liner contest entry, the author has been sent copies of both *The Third Rainbow Book of Adventures* and its companion *The Third Rainbow Adventures Tape*.)

Accessible Applications

The Magic and Mysteries of OS-9

By Richard A. White
Rainbow Contributing Editor

This begins a new series on OS-9. It is directed at current and potential Level II users who usually run a 512K CoCo 3. This combination provides a powerful, flexible computing system. Often, the price for power and flexibility is complexity, and learning OS-9 is not simple. Trying to take full advantage of OS-9 and to use any or all of the various drives (double sided, 3½" 720K or hard drives), can be confusing for awhile. (And these are just a few of the configuration options possible under OS-9.) Don't expect to be able to do all those things you wanted to do under Disk BASIC, but couldn't without investing some sweat.

Much of the fun in using OS-9 comes from its power, but with this power come many complexities. If *fun* were all there was to OS-9, it might not be worth the effort to address some of the head bangers out there . But personal productivity is another driving force, and in this regard, a CoCo 3 with OS-9 Level II offers more than most other systems. So there is considerable value in learning OS-9. This column will try to aid in mastering OS-9.

Richard White lives in Fairfield, Ohio, has a long background with microcomputers and specializes in BASIC *programming. With Don Dollberg, he is the co-author of the* TIMS *database management program.*

Where's The Magic?

For over a year now, OS-9 Level II has been available for CoCo 3s, and many have become addicted to it. There's magic in that code. It's sort of like the magic of getting your first disk drive after using a cassette recorder, and it's sort of like the step from a floppy to a hard drive. But it's not *quite* like those improvements either.

It's hard for people to really imagine how they would use a multitasking system. There are times when having your computer do two things at once can be handy. Exploring another level in *Rogue* or knocking off a quick note in your word processor while downloading a long file from Delphi or a Computer BBS is one use. Those five or 10 minute waits for a download to complete are some of the world's most boring moments.

Many files under OS-9 are now archived using special programs such as *Ar* and *Pak*. These compress one or more individual files into one file that generally is *much* shorter than the combined length of the original files. A particularly impressive process is to start a download of an archived file to a disk in one window and then move to another window and to de-archive it into its original, uncompressed component files. Until the download is complete, the file on the disk is open. OS-9 manages the de-archiving process so that it proceeds at the rate the downloading file is extended. The downloading process is in no way delayed if the de-archiving process progresses at the same pace. There is a catch. You need a no-halt disk controller or a hard drive so that the de-archiving disk accesses don't interfere with your downloading.

George, a local CoCo 3 owner, called me and asked how to set up his Burke & Burke hard drive under Disk BASIC. George's CoCo XT interface board had arrived that morning, and he had just walked in the house with a new hard drive. He was ready to use his drive, and didn't want to get bogged down in reading the start-up instructions.

I told him I had set up mine under OS-9 and could talk him through the OS-9 setup. George didn't want to attempt OS-9, but he owned Level II, so I talked him into it. Two days later, he called to say that his system was running well and that I had ruined him. It seems that he downloaded an archived file and tried the concurrent de-archiving trick described above. It worked! He was both astonished by and delighted with OS-9. After two more days passed, he called to report that he had downloaded *RiBBS* (the bulletin board program available from the OS-9 SIG on Delphi). Now, George has *RiBBS* running full time on his CoCo 3 while programming.

That George is not your typical personal computer owner is beside the point. He was in the process of writing a BBS to run under Disk BASIC, so he had the hardware, including the phone line, ready. Probably, he would have bought a second CoCo 3 once he dedicated the first one to the BBS. He had not given a thought to an OS-9-based BBS, but in the space of four days, he had one running and *still* had use of the CoCo for his own computing. He is using the same hardware I am. I have everything needed to do the same thing and so do many of you. The key is in OS-9, which has the power to make things like this possible.

I just read a column in a PC magazine that discussed multitasking with the new OS-2 operating system offered for IBM PS-2 and clone machines. But, OS-2 alone does not provide windows, so multitasking is in the traditional "background mode" that OS-9 provided before the CoCo version of Level II became available, *and* OS-2 costs about $400.

Magic For Us Mortals

Multitasking BBSs is not the real value of multitasking on a personal computer, however. More important is the ability to move from one application program to another with one or two keystrokes. For this, one needs multitasking and windows. This ability is not unique to the CoCo 3 running OS-9 Level II, but one must pay much more to get the capability in other systems. I am not talking about a program that has windows. I mean an operating system that lets you run *any* program in any appropriate window. This task is much more complex.

More examples are in order. I am running a 512K machine, which is necessary to do what I will describe. When I boot into OS-9, I load the operating system, and a number of utilities and programs. Right now, I have 88 separate executable modules in memory. Of these, 46 are operating system components, which include managers, drivers and device descriptors. Many have functional counterparts in Disk BASIC that cannot be listed separately as under OS-9, but they are still there. The remaining 42 modules include utilities like `Dir`, `Copy`, etc., which have their Disk BASIC counterparts, as well as my word processor, terminal package and a selection of other frequently used programs. Right now, I have 216K of free memory into which I could load and run other programs.

When I wrote, "Right now, I have . . ." I meant *right now.* At each of those points, I went to another window and typed to list what I had in memory and then, to find the free memory at that instant. In fact, I went back and forth between the word processing window and the memory directory list window several times to make sure I got the text right.

Something else I often do is go to another window to get a directory listing and make a new directory on the spur of the moment. After four years of using an IBM AT at the office I got this capability, but I had to spend $200 on *Sidekick Plus* to get it.

The combination of multitasking and having multiple windows is a major performance improvement. It allows us to attack those computing delays that are not addressable by speeding up the hardware and software. It changes the basic ways we use the computer. The CoCo 3 works smarter, not harder.

What Is An Operating System?

At the most basic level, an operating system is the program that makes the various components of a computer work together. Consider a 64K CoCo 2. The 6809 microprocessor knows that on start-up it must look at the very top bytes of memory to find the address of

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- ★ **Same Features as 101 Plus**
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- ★ Comes with cables to connect to your computer and printer
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Model 105 Serial Switch

- ★ Connects to your COCO to give you 2 switch selectable Serial Ports
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WHAT TO WRITE: We are interested in what you may wish to tell our readers. We accept for consideration anything that is well-written and has a practical application for the Tandy Color Computer. If it interests you, it will probably interest lots of others. However, we vastly prefer articles with accompanying programs which can be entered and run. The more unique the idea, the more the appeal. We have a continuing need for short articles with short listings. These are especially appealing to our many beginners.

FORMAT: Program submissions must be on tape or disk, and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs and debug our typing errors. All programs should be supported by some editorial commentary explaining how the program works. We also prefer that editorial copy be included on the tape or disk using any of the word processors currently available for the Color Computer. Also, please include a double-spaced printout of your editorial material and program listing. Do not send text in all capital letters; use upper- and lowercase.

COMPENSATION: We do pay for submissions, based on a number of criteria. Those wishing remuneration should *so state* when making submissions.

For the benefit of those who wish more detailed information on making submissions, please send a self-addressed, stamped envelope (SASE) to: Submission Guidelines, THE RAINBOW, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. We will send you comprehensive guidelines.

Please do not submit material currently submitted to another publication.

its start-up program. It finds memory locations that are really in the MC6883 SAM chip which hold an address that turns out to be in the CoCo BASIC ROM chip. At this point the top 32K bytes of read-and-write memory (RAM) are turned off so the 6809 can read the Read-Only Memory (ROM) chips. The 6809 doesn't care whether it is seeing ROM or RAM as long as what it reads makes sense. Obviously, what the 6809 sees does make sense. The designers of the CoCo made sure of that. What the 6809 reads is its start-up program which it dutifully performs. One of the first tasks in the start-up code is to display the message you see when you start your computer. The code for the characters in the words is there so the problem is getting the words onto your screen.

One primary task of an operating system is handling communications with components of the computer system external to the computer itself. These include the screen and keyboard, which comprise the terminal; the external storage, including tape and disk drives; the printer and other ports such as CoCo's RS-232. As a group, these are called I/O for Input/Output.

On the earliest digital computers, input and output were switches and lights only. Programmers needed to talk the computer's language — on and off. Everything was hard to make, hard to do and hard to afford. Memory was a major barrier. As permanent memory capacity became available, simple operating systems were written and stored in internal memory, allowing the computer to reach the point where it could load programs from cheaper, external, memory-like punched cards. As memory became cheaper and more available, programs and operating systems grew larger letting the computer do more of the repetitive tasks.

Returning to 1988 and the CoCo we left booting a bit ago, we find it ready. It found the operating system code to display the message and sent along the right letters and words. It wrote some start-up data on its "scratch pad" in RAM where it can change data if necessary. CoCo found out whether or not Extended and Disk BASIC were available and set itself up accordingly. Finally, it sent you an OK on the screen and waited for you to type something.

If you have Disk BASIC, you might type `DIR`. The computer will read the directory of the disk in Drive 0 and display it on your screen. Simple enough, right? Well maybe, but neither you nor I had to write the programs the CoCo used to get the directory. First, it used a program called a command interpreter which in some systems, including OS-9, is called the *Shell*. The command interpreter takes the characters you typed up to the carriage return (ENTER) and analyzes them. When it finds that the first word you typed matches a command word it knows, it processes the rest of the characters for data that goes with that command and calls the program for that command to do the work. The process of analyzing the string of characters is called *parsing*.

Parsing a character string to find a command and its parameters is one of the most basic computer functions. It's part of all modern operating systems and many programs. Since the process is to compare a character string with character strings found in memory, a command could consist of any characters, in any order, that the computer will recognize.

You could have typed `FOR X = 1 TO 1000:NEXT` and your CoCo would accept it. There would be a short delay and then the OK would reappear. Wait a minute, that's BASIC! Right. On the CoCo, the operating system and BASIC use the same command interpreter and are co-resident in the ROMs. This is not true of programming languages under OS-9 — they must be loaded separately.

What are BASIC commands, and what are operating system commands? One answer is that those commands regularly part of a separately loaded BASIC on other machines are language, and all others are operating system commands. Perhaps this is not the clearest answer, but it is the best available since BASIC is more defined than an operating system. Another way to look at the question in the Disk BASIC context is to consider all non-BASIC commands as operating system utilities and to restrict the definition of an operating system to presently unnamed pieces of program that directly interface with the system's hardware.

The utilities `DIR`, `COPY`, `LOAD`, `RENAME`, `BACKUP`, etc., all need to read information from a disk. Each does a different thing with the information once it has it. Each uses the same code to read the disk, so that code only needs to be present once so that each utility can call it when needed. Do you start to see a building block process? There are some basic function code pieces, let's call them primitives, that are used by higher level utilities. In turn, these utilities can be called by other utility programs. Keep this hierarchy in mind, for this type of structure is more evident in OS-9.

Although CoCo BASIC does some unexpected things (like including a resident BASIC), there are some things that operating systems on larger computers can do that CoCo BASIC does not. One difference is CoCo's inability to read commands from a file on disk. Another, it is not easily changed. CoCo 1s and 2s are particularly difficult since the operating system and BASIC are normally run from ROM, which cannot be changed.

While the CoCo 3 has ROMs, it runs from RAM. On start-up, the ROMs are enabled. Part of the start-up sequence is to read the ROMs into RAM and then change the code. This is why the old Version 1.0 Disk BASIC ROM will work in a CoCo 3 even though it was replaced by Version 1.1 five years ago.

If the CoCo 3 has Disk BASIC in RAM, theoretically one can poke in bytes to change it. Fine, what do I poke where? Ah, there's the rub. Although few people have taken Disk BASIC apart to see what makes it tick, and some have written software to change or enhance it, this is not a task for a typical BASIC programmer. Further, software that does enhance Disk BASIC is typically written into larger programs like a disk management or a fancy terminal program. When you want to run a BASIC program, these enhancement programs are not running, so you are back to to what Disk BASIC offers.

What's wrong with what Disk BASIC gives you? Single sided, 30-ms step rate drives have not been manufactured for several years. My 80-track, double-sided, six-ms step rate, 720K, 3½-inch drive works just fine under Disk BASIC. It uses 35 tracks on one side at 30-ms and stores 156K bytes. Using a special driver, I can access my hard drive from Disk BASIC, but then some machine language software I like won't work. Disk BASIC does not support disk directories, but that is no problem with a small disk capacity. While MS-DOS and OS-9 have type-ahead buffers built into the operating system, Disk BASIC does not. One of the reasons I went to OS-9 in the first place was that I got tired of losing characters in my Disk BASIC word processor. To have all the features I wanted, I needed a more powerful system.

How Does OS-9 Do It?

The first CoCo went on sale in September, 1980. Extended BASIC was ready in March of the following year. Disk BASIC followed in the fall. The design of the system reflects good consumer, microcomputer technology for the CoCo's intended time and market. OS-9 took an entirely different path. A look at its history sheds light on this difference.

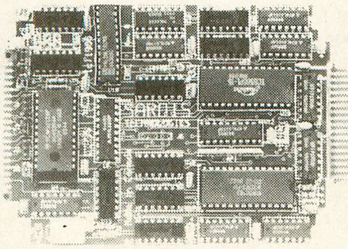
OS-9's characteristics reflect different goals from other microcomputer operating systems. The 6809 appeared in the late 1970s, and Motorola contracted with Microware to provide an operating system to utilize the special characteristics of the chip. The 6809 had been designed with multitasking in mind, and this operating system was to provide this capability. Since memory was costly in those days, memory economy was an important factor. To access the industrial instruments and controls market, the system needed to be in ROM. In addition, programming utilities would not need to be in the operating system included in the final hardware. The final operating system would be different than the development system, and the memory in the final hardware would be smaller than in the machine that developed the software. The program modules in the final machine would not be in the memory location used while being written.

Remember I said I have 88 modules in memory. Except for a few, each is relocatable — it can be loaded into any location in memory. Over the past year, I have revised my operating system a number of times. Many of the modules are the same, but relocated. Moreover, none of the programs today occupy the memory locations they did six months ago. Clearly OS-9 is a modular system that can be shaped one way for one application and another for the next

Today OS-9 is true to its original design objectives and provides outstanding performance at very low cost. With OS-9, any program module can be loaded anywhere in the memory space and still be executed *if* the code is written in relocatable form. This means that addresses are expressed *relative* to the program counter register in the 6809 and not in *absolute* terms. Data is accessed by offsets from the beginning of the data space, which can then be located anywhere in the logical memory space.

Traditionally, multitasking submits a task to the operating system using some form of job control language. The operating system works on the job in the background while the user has use of the terminal for another task. Output from the job goes to a disk or printer — seldom to the terminal. This is the way multitasking works in the brand new OS-2 operating system.

But a new idea was developing — windows through which a user could quickly access different programs and jobs. Thus, you are able to switch between different jobs without actually running those jobs concurrently. An outgrowth of this idea is TSR (terminate and stay resident) software for MS-DOS. The first was *Sidekick* which is generally loaded on bootup and then called by pressing CNTRL-ALT keys. One



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Did you know?
. . .that all the older floppy disk controllers for the CoCo completely tie up (and even halt) the 6809 processor during disk reads and writes? No wonder your keyboard is constantly "losing" characters! Or that your serial port often gives you garbage.

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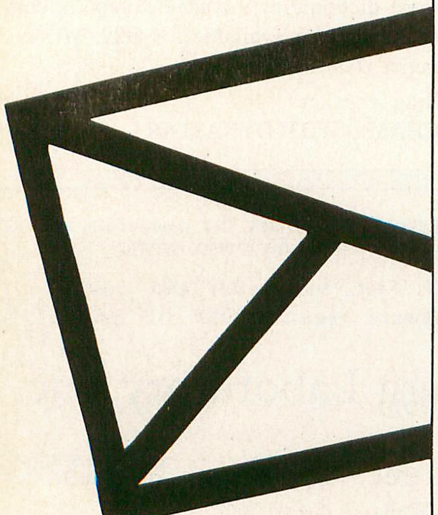

can be working on a spreadsheet or using a wordprocessor, instantly switch to *Sidekick* to use one of its utilities and then pick up where the first job was left off.

There are problems here. If you try to have a number of TSR programs in the machine at once, they will fight to use the same DOS connections. Documentation and magazine articles recognize this problem and give sage advice like "load this program first." When you have two programs that give this same advice, you really have problems. Is it any wonder that an owner of an MS-DOS machine who has had this problem would doubt us when we promise no problem under OS-9 — particularly when our CoCo system costs half as much?

The key to OS-9's success lies in the way the operating system manages the program modules so that each has access to the operating system resources as needed. Each running module is allocated a time share of the computer. If it has nothing to do, it goes to sleep, and OS-9 wakes it up when work arrives. The operating system keeps a list of where each module is in memory and sees that other modules don't interfere with it.

Each piece of OS-9's operating system is reasonably accessible, changeable and replaceable. The system can grow with the computer. When I added a double-sided drive, I changed my device descriptor, and all my applications used it as double-sided. When I got a hard disk, I added a new driver and device descriptor, and all my applications now run from the hard disk.

It's almost like managing a baseball team and changing the lineup from time to time. And, like members of a team, each player has special skills. Next month, we will introduce some of the players and see how they operate.

Getting Started With OS-9

When purchasing OS-9, the best advice is to start slow and easy. Don't begin with hardware for OS-9 alone. This is particularly true of RAM upgrades with prices inflated by high chip costs. Chip costs should stay high until the end of 1988. Watch for before-Christmas sale prices. October through December are good months to buy CoCos. Level I OS-9 is obsolete so don't pay the $69.95 list.

BASIC09 in the OS-9 Level II package, which costs $79.95 list, is identical to software that sells separately for $99.95. The Level II package has better documentation and the complete Level II operating system. CoCo 1 and 2 owners who are running Level I and are considering buying BASIC09, should buy OS-9 Level II.

CoCo 1 and 2 owners who need to buy OS-9, should make sure to get Level I, Version 2. This is an upgrade and includes many new features not previously available. It is available through Radio Shack (Cat. No. 700-2331) for about $25. It will run on a CoCo 3 when you upgrade; Version 1 will not.

Watch for real deals on Level I. It has an assembler, `Def` files and a number of utilities like `DeBug`, `Save` and `Verify` that will run under Level II, but are not *in* the Level II package. Make sure the Level I package is complete with the three manuals included.

OS-9 documentation is terse, though fairly complete. It's not bug free. Those with photographic memories will appreciate it. If you want something not so industrial strength, try *The Complete Rainbow Guide to OS-9* by Dale Puckett and Peter Dibble, $19.95. Most of this basic primer for Level I is directly useable in Level II. There is a rumor that this book is not for Level II. This is not necessarily true. Just remember that some of the examples in the book are particular to Level I.

The Complete Rainbow Guide to OS-9 Level II: A Beginner's Guide to Windows, Volume 1 by Dale Puckett and Peter Dibble, $19.95, offers more OS-9 in easy doses, neat Level II graphics using operating system commands *only* and a good discussion of Level II graphics using BASIC09 — available from Radio Shack (Cat. No. 26-3188) or from THE RAINBOW.

Basic OS-9 Tour Guide, by Dale Puckett, $14.95, (Cat. No. 26-3189) discusses Level I and II, but not windows. Puckett takes you through BASIC09 at his typical, comfortable rate and provides plenty of easy keyboard exercises along the way.

Software and Hardware

Ar and *Pak* are public domain utilities available for download from many BBS's and from the Delphi OS-9 SIG Database under Utilities. *RiBBS* is in the Delphi OS-9 SIG Database under the Telcommunication topic.

The CoCo XT hard drive system was developed by Chris Burke of Burke & Burke. Other RAINBOW advertisers selling the Burke & Burke interface, separately and in systems, include Frank Hogg Labs and Howard Medical.

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Barden's Buffer

Assembly Language for the Complete Novice

By William Barden, Jr.
Rainbow Contributing Editor

Assembly language has a special mystique. No matter how many "high-level" languages come out, people keep coming back to assembly language as the ultimate programming language for the CoCo and all other computers. There are three good reasons for this:

- Assembly language is fast.
- Assembly language is really fast.
- Assembly language is really darn fast.

Assembly language is sometimes hundreds of times faster than interpretive BASIC. Usually, it's at least dozens of times faster than interpretive BASIC and ten times as fast as compiled BASIC09.

Can you learn assembly language? Maybe, but maybe not. If you're fairly proficient in at least one other language, such as BASIC, you'll probably be able to learn assembly language. If you're a "hardware type," you'll probably be able to learn it as well. It doesn't require math beyond arithmetic, and it doesn't require a great deal of abstract thinking. It does require a hacker's love of computers. (Being a masochist also helps.)

In this column and the next, I'll start you from the ground up to give you an idea of what's involved in assembly language. Then you can decide whether assembly language is for you.

The Advantages of Assembly Language

Besides speed, there are several advantages to learning assembly language:

- Short AL subroutines can be used to speed up your critical BASIC code.
- Learning one AL makes it easy to learn assembly languages for different microprocessors or systems.
- AL knowledge is a marketable programming commodity.

The Disadvantages of Assembly Language

There are some severe disadvantages to assembly language as well:

- Learning assembly language is a major undertaking.
- Programming in assembly language takes much longer than programming in BASIC or another language — as much as ten times longer.

If you're still with me in spite of the disadvantages, let's start from the ground up.

How to Talk to a Machine

The CoCo 1, 2 and 3 use versions of the Motorola 6809 microprocessor. This microprocessor is similar in power to the Intel 8088 used in MS-DOS systems, but it has a much cleaner instruction set. The 6809 instruction set is known as a "classic" programmer's instruction set.

A microprocessor is just a conveniently packaged part that includes a great deal of electronic circuitry in a single package — circuitry that previously required tens of thousands of transistors, resistors, capacitors and other parts to implement.

Instruction Set

One of the things hard wired into the microprocessor is an instruction set. What instructions should be implemented in a microprocessor? Since even the simplest instruction takes a great deal of electronic logic, microprocessor instruction sets are limited to simple instructions. Certainly there should be instructions to add two numbers, to subtract two numbers, and possibly even multiply two numbers. There should also be instructions to jump to another sequence of instructions

---

Bill Barden has written 27 books and over 100 magazine articles on various computer topics. His 20 years' experience in the industry covers a wide background: programming, systems analysis and managing projects for computers ranging from mainframes to micros.

(similar to a BASIC `GOTO` or `GOSUB`), to compare two numbers (similar to a BASIC `IF. . .THEN. . .GOTO. . .`), to move data between memory and the microprocessor and to perform Input/Output.

The built-in instruction set is determined by many things — the instructions used in the company's previous microprocessors, the complexity of the instructions, the instructions used in competing microprocessors, and the whim of the microprocessor designer.

Machine Language

The total instruction set of the microprocessor is called the machine language of the microprocessor. A program consists of a sequence of machine language instructions. Before assemblers were available, programmers (they were called computer engineers then) had to sit down with the instruction set of the microprocessor and hand code a long list of machine language instructions to perform some function. Suppose we wanted to find the largest number of a list of ten signed (positive or negative) numbers. The ten numbers are located in memory at locations $4000 through $4009, where the dollar sign stands for *hexadecimal* (in decimal these locations are 16384 through 16393).

Working from the entire list of machine language instructions, we might come up with this program:

1. Load accumulator with 0.
2. Set memory pointer to `$4000`.
3. Compare the number in the accumulator with the current memory location.
4. If the number in memory is larger, put that number in the accumulator.
5. Increment the memory pointer by one (from `$4000` to `$4001`, etc.).
6. If the pointer is not `$400A`, loop back to Step 3.

This sequence of instructions is typical of the level of programming used by machine and assembly language. All assembly language works with such rudimentary operations and builds from these low-level operations to more complex programs.

The actual machine-language instructions to perform this operation are shown here:

```
1. LDA #0            10000110 00000000
2. LDX #$4000        10001110 01000000 00000000
3. CMPA ,X           10100001 10000100
4. BGT (Step 5)      00101110 00000010
   LDA ,X            10100110 10000100
5. LEAX +1,X         00110000 00000001
6. CMPX #$400A       10001100 01000000 00001010
7. BLT (Step 3)      00101101 11110011
```

We've numbered our steps in the same way our original series was numbered.

Some of these steps may seem mysterious to you. You may not know what an accumulator is or what the `+1,X` represents. However, you can see the flow of steps necessary to perform the operations.

Binary and Hexadecimal

In coding-up the machine language instructions, we converted from the abbreviated form, such as `CMPA` to binary

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numbers, (10100001). In machine language coding, the instruction set of the microprocessor is listed as a series of mnemonics — abbreviations of the instructions. It's much easier to type in `LDA`, for example, then `Load the A accumulator`. These mnemonics are established by the microprocessor's manufacturer (in this case Motorola) and used in both machine language and assembly language programming.

The numbers to the right of the mnemonics are the actual machine language of the program. A microprocessor, like all computer circuitry, works only with *binary numbers* — an electrical circuit can only be off or on, a signal can be present or not present, and so forth. The machine language instructions are encoded as binary digits — bits — of 0 or 1. The 10000110 code above, for example, stands for the `LDA` instruction. Whenever the 6809 encounters that code, it knows that the instruction will load the accumulator with the value immediately following in the next byte (eight bits). In this case the next byte is 00000000, a zero value. Since bytes are commonly used in memory and other computer circuitry, the 6809 instructions are geared to byte multiples — instructions are one, two, three, four, or five bytes.

Therefore, the entire program for finding the largest number exists in computer memory as 144 bits (18 bytes). This is an actual hand-coding of the program and you could enter this code in CoCo memory to find the largest number of the ten in memory locations $4000 through $4009.

Hexadecimal notation is a shorthand version of binary. To convert a binary number into a hex digit, use this table:

Binary	Hex	Binary	Hex	Binary	Hex
0000	0	0110	6	1100	C
0001	1	0111	7	1101	D
0010	2	1000	8	1110	E
0011	3	1001	9	1111	F
0100	4	1010	10		
0101	5	1011	11		

The hexadecimal representation of the machine language above is:

```
1. LDA #0         10000110 00000000                 86 00
2. LDX #$4000     10001110 01000000 00000000        8E 40 00
3. CMPA ,X        10100001 10000100                 A1 84
4. BGT (Step 5)   00101110 00000010                 2E 02
    LDA ,X        10100110 10000100                 A6 84
5. LEAX +1,X      00110000 00000001                 30 01
6. CMPX #$400A    10001100 01000000 00001010        8C 40 0A
7. BLT (Step 3)   00101101 11110011                 2D F3
```

Hex is represented in BASIC by the prefix &H. The number &H30 is hexadecimal 30, binary 00110000, and decimal 48. CoCo BASIC has no way to represent binary numbers, so hex is often used in place of binary. In machine or assembly language coding, hex numbers are prefixed by a dollar sign ($). The number $2E is hexadecimal 2E, binary 00101110, and decimal 46. Because decimal numbers are often used without any prefix, one of the more common errors in assembly language coding is to mistake decimal numbers and hexadecimal numbers for each other.

6809 Architecture

The 6809 microprocessor design is called its architecture. The word architecture is a fancy way of telling you what's inside the chip.

Registers

Every microprocessor has from two to dozens of registers. The 6809 registers are shown in Figure 1. A microprocessor register is very similar to a memory location. In fact, it's a fast memory location within the microprocessor. Registers are used to hold temporary results. The microprocessor register is usually denoted by a letter, such as A (accumulator) or X (index register). In ML instructions, a register is denoted by a binary code such as 00, 01, 10 or 11.

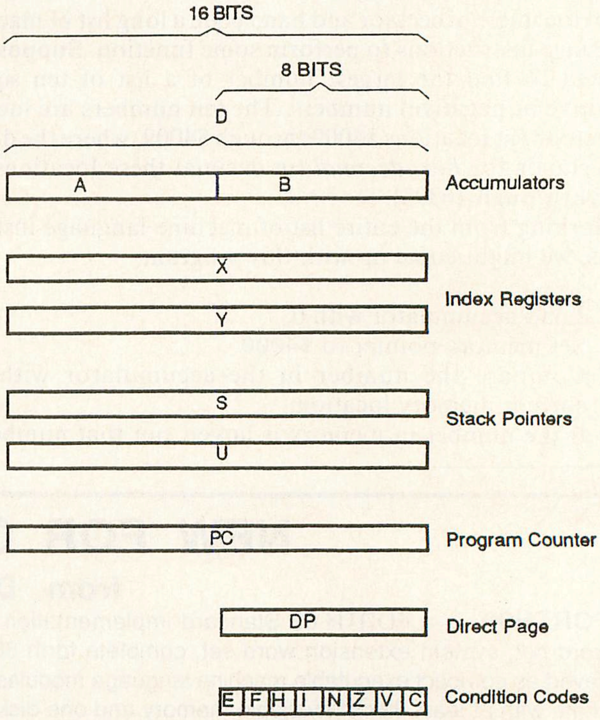

Figure 1: 6801 Registers

The A and B registers are called accumulator registers. This term dates back to the origins of computers in the '40s. The A and B accumulators are used for addition, subtraction and other instructions. The A and B registers are eight-bit registers. Taken together they make up one double-sized register called the D accumulator.

Typically, one operand for an instruction is held in A, B, or D and the second operand is taken from memory. The result goes back into A, B, or D. In the compare instruction (`CMPA`), the number in A was compared with a number somewhere in memory.

The X and Y registers are 16-bit registers, twice the size of the A and B accumulators. They are index registers. Index registers are used to address memory. Although an absolute memory location can be used in an instruction (such as `LDA $4000` to load the contents of memory location $4000 into accumulator A), memory can also be addressed with an index register. In the code above, the X index register was loaded with a value of $4000. This value points to a memory location. The `CMPA ,X` instruction used the contents of X as a pointer to access memory. The X register contents had one added to it at the end of the loop to point to the next location. Since many operations in assembly language involve accessing (reading and writing) data in sequential locations, index registers are often used. Imagine trying to scan a list of values from $4000 through $4300 by using direct addresses (`CMPA $4000`, `CMPA $4001`, `CMPA $4002`, etc.).

The U and S registers are stack pointer registers. These registers refer to an area in memory called a stack. The stack area is a small area (a few hundred bytes) located anywhere you choose to put it — preferably somewhere it won't be overwritten by other data.

The stack records return addresses for subroutine calls, temporary data, and addresses for interrupt processing. The 6809 instruction set makes provision for subroutines. Subroutines are code sequences that can be called from many points within a program, rather than replicating the code in many places. Subroutines are like BASIC `GOSUB` subroutines. Like the `GOSUB` subroutines, the return point is saved. In the 6809, the return point is saved in the S stack. An `RTS` instruction retrieves the return address from the stack and performs an action similar to the BASIC `RETURN`.

The S stack is used automatically for subroutine and interrupt actions — the logic is hard-wired into the microprocessor design. The U stack is a user stack. It is a second stack that can be used for any storage that is convenient for the user.

The PC register is a program counter. The program counter is a memory pointer that points to the next instruction to be executed. Machine language instructions are stored in memory, read a byte at a time, and processed by the 6809. The program counter points to the next byte of the current instruction. It's automatically incremented by the microprocessor logic, based upon the length of the instruction. It is changed by jump or branch instructions, which cause a conditional (based upon results) or unconditional (always done) jump to a new sequence of instructions. The jump or branch may be one instruction away or thousands of instructions away, just as BASIC `GOTO`s jump to program lines that are close or far away. The program counter is normally not used by the programmer.

The DP, direct page, register is used in a special form of addressing, which addresses data in a 256-byte page. Any 256-byte page in memory can be specified.

Condition codes are treated as an eight-bit register. However, they are really separate bits. The condition codes are set or reset upon the results of operations. When adding two numbers, for example, the Z condition code is set if the result is 0, and the N condition code is set if the result is negative. The condition codes are used in conditional branching instructions such as `BNE` (Branch on Not Equal).

Memory

The 6809 microprocessor uses a 64K- (65,536) byte address space. This means that the 6809 can address locations within this 64K-byte range. It requires a 16-bit address to do so. The lowest address in this range is 0000000000000000 in binary ($0000 or 0 decimal). The highest address in this range is 1111111111111111 in binary ($FFFF or 65,535 decimal). The basic 64K limitation of the microprocessor can be extended by memory banking or by special hardware. This is the scheme used in the CoCo 3, which allows up to 512K bytes

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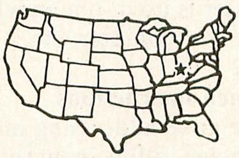

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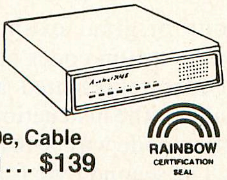

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of memory, controlled by the GIME chip. Even though different 64K blocks of memory can be rapidly mapped in and out in the CoCo 3, the 6809 can only address 64K at any given time.

Certain addresses in high memory must be reserved by the microprocessor for interrupt vectors (addresses of interrupt processing subroutines). In general, however, the division of the 64K of memory is up to the computer designer and not to the microprocessor manufacturer. In the CoCos, the first 32K is generally RAM (random-access or read/write memory), while the high 32K is ROM (read only or cartridge memory) and hardware addresses (disk controller, PIAs, etc.).

Opcodes and Memory Addressing

Some instructions in the 6809 require no memory operand. The `CLRA` instruction, for example, simply puts a zero into the A accumulator. These are generally one-byte instructions. In the `CLRA` instruction, the machine language code is 01001111 ($4F).

Other 6809 instructions, though, do require the address of an operand in memory. For example `ADDA` adds the contents of the A accumulator and a memory operand and puts the result back into A. The first byte of this instruction is 10111011 ($BB), which is an opcode, or operation code, informing the microprocessor of the instruction. However, a memory address is also required. Two bytes of memory address would allow us to add the contents of any memory location within the 64K bytes. Thus, to add the contents of memory location $4000, the complete instruction would be 10111011 01000000 00000000; the first byte is the operation code, while the second and third bytes is the memory address ($4000) of the memory operand.

All of the 6809 instructions could have the opcode in the first byte, and the memory address in the second and third bytes. However, when the 6809 was designed, memory was expensive, and memory space was limited. Therefore, the 6809 instruction set uses a variety of addressing modes to save memory by making the instructions shorter. Here are the types available:

- Inherent
- Direct
- Extended
- Immediate
- Indexed
- Relative

In the inherent addressing mode, the instruction needs no memory address. The `ASLA` instruction (01001000) shifts the A register left one bit and requires no memory address.

Direct addressing mode forms the memory address by taking the contents of the Direct Page register and adding the second byte. The result is an effective memory address. `ADDA $09` adds the contents of $4009, providing that the DP register contained $40. The instruction is 10011011 00001001. The first byte is an opcode and the second byte is half of the address.

Extended is the "normal" addressing type where the second and third bytes of the instruction represent the memory address to be used. `ADD $4009` adds the contents of memory location $4009 to the A register. The instruction is 10111011 01000000 *00001001*, where the first byte is an opcode and the second and third bytes are the memory address.

Immediate addressing mode tells the microprocessor that the data in the second byte of the instruction (or second and third bytes, for certain instructions) is to be used as the operand. Thus, `ADDA #$45` adds $45 (decimal 69) to the contents of the A register. The instruction, 10001001 01000101, has an opcode in the first byte and an operand in the second. An `ADDD #$1000` would have three bytes since the operand would be two bytes long for the D register — 10001011 00010000 00000000.

In the indexed addressing mode, the effective memory address is computed by adding the contents of a register, usually X or Y, to the value of a displacement field in the instruction. The instruction `ADDA 100,X` for example, would find the effective memory address by adding the contents of the X register to 100 decimal. This address would then be used to get the memory operand. The instruction here would be 10101011 10001000 01100100. The first byte is an opcode as before. The second byte is code to specify the index register to be used and the length of the displacement field. The third byte is the value of the displacement field ($64 = 100 decimal). This is the hardest type of addressing mode to decode, so it may seem a little abstract. We're not giving you all the details here, either.

> ***"If you're fairly proficient in at least one other language, such as BASIC, you'll probably be able to learn assembly language."***

There are many different indexed addressing modes, some of which are mutually exclusive. These include an indexed addressing mode in which the index register is automatically incremented or decremented by one, one in which the U stack pointer is used, one in which the program counter is used as a memory pointer, etc.

Branch Instructions

Relative addressing mode is used for branch instructions. Branches allow you to test the condition codes after an operation like load (move an operand from memory into a register) or add. Short branches have an opcode in the first byte and a displacement field (positive or negative) in the second byte. The effective address for the branch is computed by adding the contents of the program counter, which points to the instruction following the branch, to the value of the displacement field.

Let's return back to our original example. The `BGT` instruction there tested the condition codes after a compare (`CMPA`). If the condition codes represented a greater than condition, a branch was made to the instruction *after* the `LDA ,X` instruction. The instruction code was 00101110 00000010. The first byte is an opcode. The second byte is a displacement value of 2. If the condition codes represent greater than, this displacement field is added to the contents of the program counter. This results in a branch to the `LEAX 1,X` instruction, two bytes further away.

The rationale behind relative addressing is that a branch instruction uses a two-byte- instead of a three-byte-instruction for a full 64K memory address. The branch address can only be 126 bytes back or 129 bytes forward from the short branch instruction, but this is usually enough to get to a new set of instructions. (A Western-sounding long branch allows a branch anywhere within the 64K address space.)

When to Use Which Addressing Mode

Unfortunately, not every addressing mode can be used with every instruction. You can't use a relative addressing mode with an `ADDA`, for example, and you can't use an indexed addressing mode with a `BNE` instruction. Knowing which addressing mode is valid comes with using the instruction set with reference to a table of opcodes and addressing modes. This is one of the joys of using assembly language.

The 6809 Instruction Set

There are about 60 different instructions for the 6809. As we mentioned earlier, most of these perform very basic operations compared to high-level languages. We'll describe the instructions here by function.

Load Instructions

These instructions load a register with either a memory operand or an immediate value. This is typically the way to get memory data into a microprocessor register where it can be used to add, subtract, compare, shift, etc. The `LDA`, `LDB`, `LDD`, `LDS`, `LDU`, `LDX` and `LDY` instruction mnemonics load the A, B, D, S, U, X or Y registers. The first two instructions transfer one byte from a memory location or immediate value. The other instructions transfer two bytes from two consecutive memory locations or from immediate value. The sign (N) and zero (Z) condition codes are determined by the result of the load.

`CLRA`, `CLRB` and `CLR` clear either the A or B registers or a memory location — a zero is loaded.

Store Instructions

These are the opposite of the loads. They store a value from a microprocessor register to memory. The `STA`, `STB`, `STD`, `STS`, `STU`, `STX` and `STY` instructions store the contents of the A, B, D, S, U, X or Y registers to a specified memory location. The first two instructions transfer one byte to a memory location. The other instructions transfer two bytes to two consecutive memory locations. The sign (N) and zero (Z) condition codes are determined by the result of the store.

Add Instructions

These instructions add a memory operand or immediate value to the contents of a register, while the result goes back to the register. The condition codes are set on the result. `ADDA`, `ADDB` and `ADDD` add an operand to the A, B or D registers, respectively. The `ADDD` instruction adds two bytes from two consecutive memory locations; the others add one byte.

The `ADCA` and `ADCB` instructions are like the `ADDA` and `ADDB` except that the state of the carry condition code (`C`) is included. The carry condition code can be either a zero or a one, so the result is either the same as an `ADDA` or `ADDB` or one greater. These instructions are used in multiple-precision arithmetic where more than one or two bytes constitutes a value.

The condition codes are determined by the results of the add operation.

The `INCA`, `INCB` and `INC` instructions add one to A, B or a memory location contents.

The `ABX` instruction is a unique instruction, which adds the contents of the B register and the X register with the result going into X.

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Subtract Instructions

The SUBA, SUBB, SUBD, SBCA and SBCB work much like the add instructions, except that the memory or immediate operand is subtracted from the register with the result going back to the register. The SBCA and SBCB subtract the current state of the carry condition code. As in the add, the condition codes are determined by the result.

The DECA, DECB or DEC subtract one from the contents of A, B or a memory location.

Compare Instructions

The Compare instructions, CMPA, CMPB, CMPD, CMPS, CMPU, CMPX and CMPY, work like the subtract instruction, setting the condition codes on the results. However, the result is *not* stored in the register. The compares are a way of setting the condition codes for a conditional branch without destroying the contents of a register.

TSTA, TSTB and TST test the sign and zero state of the contents of A, B or a memory location, setting the N and Z condition codes accordingly.

Logical Instructions

The ANDA, ANDB, ORA, ORB, EORA and EORB instructions work like add instructions, except that a logical AND, OR or exclusive OR are performed. The result is put back into the register and the N and Z condition codes are affected. The result is identical to a BASIC AND or OR (the exclusive OR is like an OR, except that a one and a one produce a zero instead of a one as in the OR).

ANDs are used to test certain bits within a byte. ORs are used to set certain bits within a byte. EORs are used less frequently for other bit operations.

Shift Instructions

ASRA, ASRB, ASR, LSRA, LSLA, LSR, LSRB, LSLB, LSL, ROLA, ROLB, ROL, RORA, RORB and ROR perform an arithmetic shift right, a logical shift right or left, or a rotate left on either the contents of A, B or a memory location.

A logical shift moves an operand one bit left or right. If the operand is 10101111, an LSR would produce 01010111.

A rotate moves the bit shifted-out the to the other end of the register. Doing an ROR of 11110001 would result in 11111000 (-64) results in 11100000 (-32).

Shifts are used to align and test individual bits of a register. The carry condition code receives the shifted-out bit. A branch on carry can test the bit.

Conditional Branch Instructions

Conditional branch instructions are relative addressing instructions that test one or more condition codes set on a prior operation (add, subtract or shift). If the condition is met, the branch is made. If not, the instruction does nothing and the next instruction in sequence is executed.

BCC and BCS test the carry condition code and branch if the carry is clear(0) or set(1).

BEQ and BNE test the zero condition code and branch if the zero condition code is set (equal) or reset (not equal).

BPL and BMI test the sign condition code and branch if the previous result was plus (0) or minus (1).

BVC and BVS test the parity bit and branch if parity is clear(0) or set(1). The parity condition code reflects the number of one-bits in an operand and is used infrequently.

BLT, BLE, BGE and BGT branch if the previous result was less than, less than or equal, greater than or equal, or greater than. These conditional branches are typically used after a compare instruction, which compares two signed operands.

`BLO`, `BLS`, `BHS` and `BHI` branch if the previous result was lower, lower or the same, higher or the same, or higher. These conditional branches are typically used after a compare of unsigned operands, such as two memory addresses.

`BRA` and `BRN` branch Always and Never. The first is an unconditional branch, and the second is a "no operation" instruction.

Jump Instructions

The `JMP` instruction causes a jump to a specified memory location. The `JSR` instruction causes a jump to a subroutine. The return address is stored in the S stack. The `RTS` instruction retrieves the return address from that stack and causes a return to the instruction following the `JSR`.

Stack Instructions

`PSHS`, `PSHU`, `PULS` and `PULU` push or pull data from the S or U stack. These instructions are used in storing temporary results in the stack, to allow the stack to pass parameters to subroutines or to reset the stack.

Miscellaneous Instructions

`COMA`, `COMB` and `COM` change all ones to zeroes and all zeroes to ones for the contents of A, B or memory location. This is a ones complement operation.

The `NEGA`, `NEGB` and `NEG` are like a ones complement, but add one to the result making them twos complements. This changes the sign of signed data. A -5 is changed to a +5.

The `DAA` instruction allows the 6809 to perform decimal arithmetic add and subtract instructions. The result is adjusted from binary to a binary-coded-decimal form.

The `SEX` instruction (some engineer at Motorola has guts) sign extends the sign of the B register into the A register. This is used to create a proper 16-bit signed number in D.

`MUL` is a multiply instruction that multiplies A times B and puts the result into D (A and B). A powerful instruction, as microprocessors go.

`SWI` causes a software interrupt, an instruction used in multitasking programming. `SYNC` is another interrupt-related instruction not used in the CoCo. `RTI` is like an `RTS`, but causes a return from interrupt processing. `CWAI` is used in some systems as a wait for an interrupt.

`NOP` is a no operation instruction that does nothing but waste time and fill up space (yes, `NOP`s are used for those purposes).

Using the Instruction Set

Now that we know what's inside the 6809, we can put the instructions and addressing modes together to create some useful programs. Next month I'll describe how to do this by hand with machine language and BASIC, and automatically with an assembler. In the meantime, you might try to locate a book called *Color Computer Assembly Language Programming* by William Barden, Jr. (no relation). Although it's been discontinued by the Shack, it still may be found at some stores. It covers beginning assembly language on the CoCo.

Also useful is the *Motorola 6809 Programming Manual.* Check with Motorola Semiconductor Products, Inc., 3501 Ed Bluestein Blvd., Austin, TX 78721. This book is the definitive source document for 6809 instructions and contains instruction definitions and some programming tricks.

Alas, Radio Shack has discontinued the *EDTASM+* disk assembler in favor of the OS-9 assembly language development system. Although the OS-9 assembler works, *EDTASM+* is perfect for beginners. It operates in an environment that combines an editor, assembler and debugger in one powerful package. If you can locate this in any version, it's worth the trouble. See RAINBOW, September '83 (Page 66), March '84 (Page 156), and August '87 (Page 154) for information on Roger Schrag's *Superpatch*, a patch to transfer and convert the *EDTASM* ROM pack to disk. Please *do not* write to me. I can't legally supply the assembly language or any version of *EDTASM+*, and I don't have the *Superpatch* data. Sorry.

If you're still with me, next month we'll conclude this assembly language discussion with some interesting program examples.

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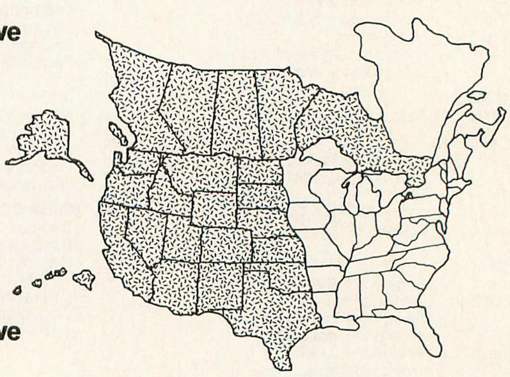

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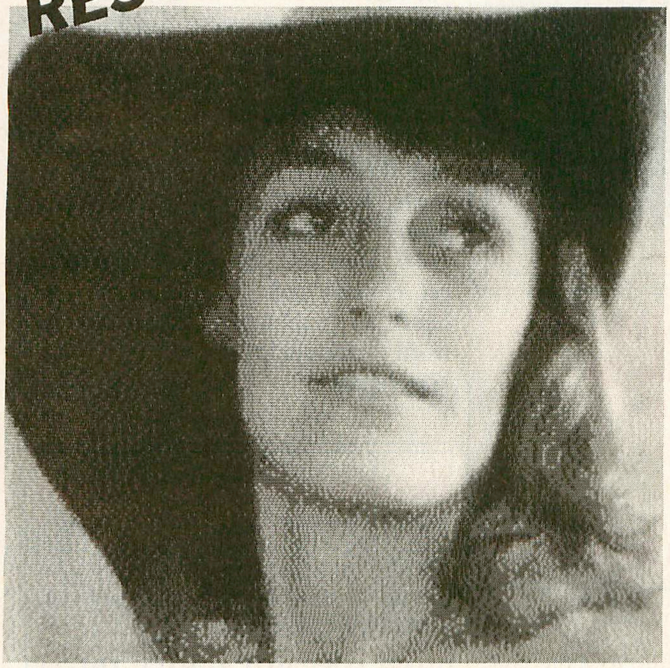

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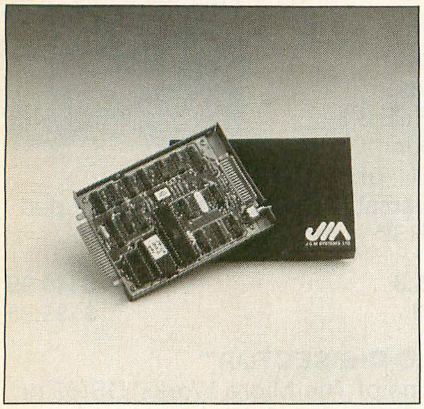

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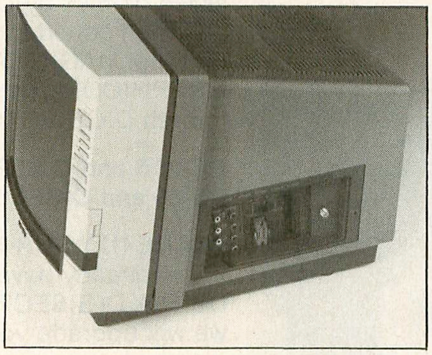

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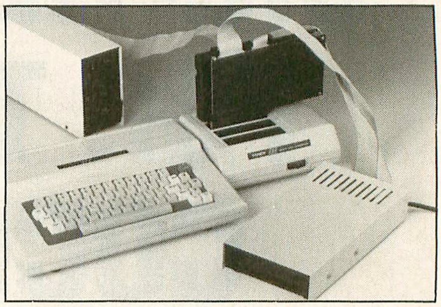

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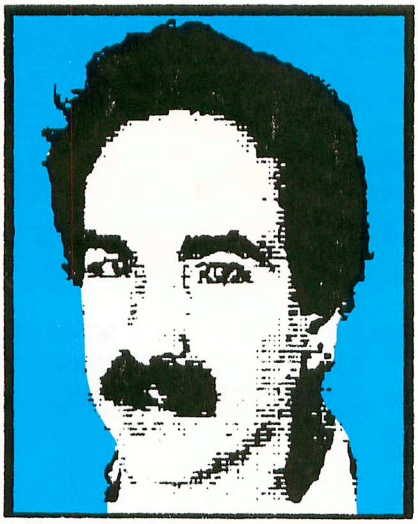

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